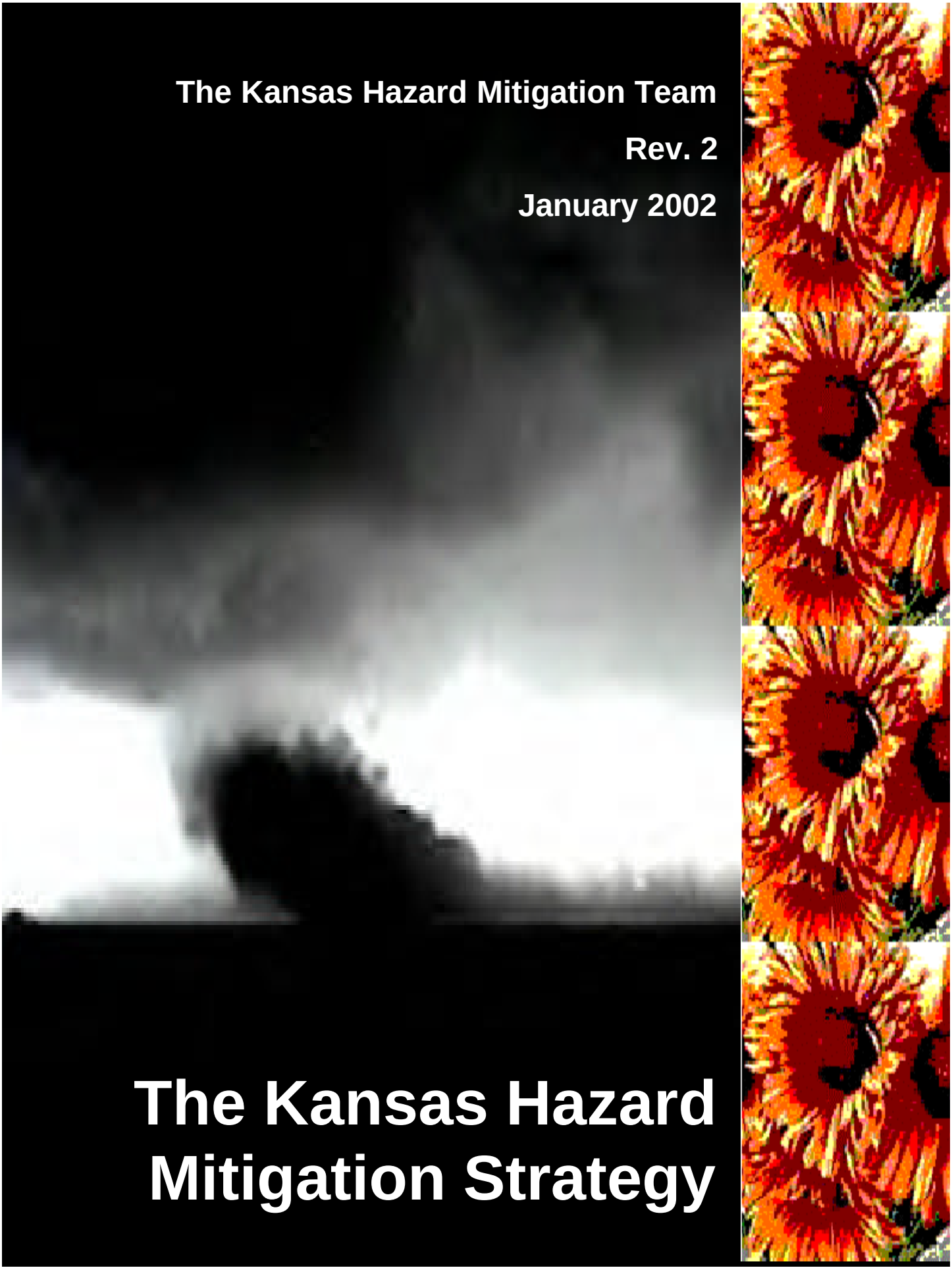

The Kansas Hazard Mitigation Team

Rev. 2

January 2002

The Kansas Hazard Mitigation Strategy

The Kansas Hazard Mitigation Strategy

Revision Two, January 2002

APPROVALS AND AUTHORIZATIONS

Kansas Commission on Emergency Planning and Response

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Title

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Signature Date

Participating Agencies

Information Network of Kansas, Inc.

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Title

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Signature Date

Kansas Corporation Commission

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Signature Date

The Kansas Hazard Mitigation Strategy

Revision Two, January 2002

APPROVALS AND AUTHORIZATIONS
Continued

Kansas Department of Agriculture

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Kansas Emergency Management

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Kansas Department of Health and Environment

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Kansas Department of Human Resources

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Kansas Department of Commerce and Housing

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The Kansas Hazard Mitigation Strategy

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APPROVALS AND AUTHORIZATIONS
Continued

Kansas Information Technology Office

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Kansas Department of Transportation

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Kansas Fire Marshal

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Kansas Forest Service

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Kansas Geological Survey

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The Kansas Hazard Mitigation Strategy

Revision Two, January 2002

APPROVALS AND AUTHORIZATIONS
Continued

Kansas Highway Patrol

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Kansas State Historical Society

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Kansas Conservation Commission

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Kansas State University Extension Service

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Kansas Water Office

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The Kansas Hazard Mitigation Strategy

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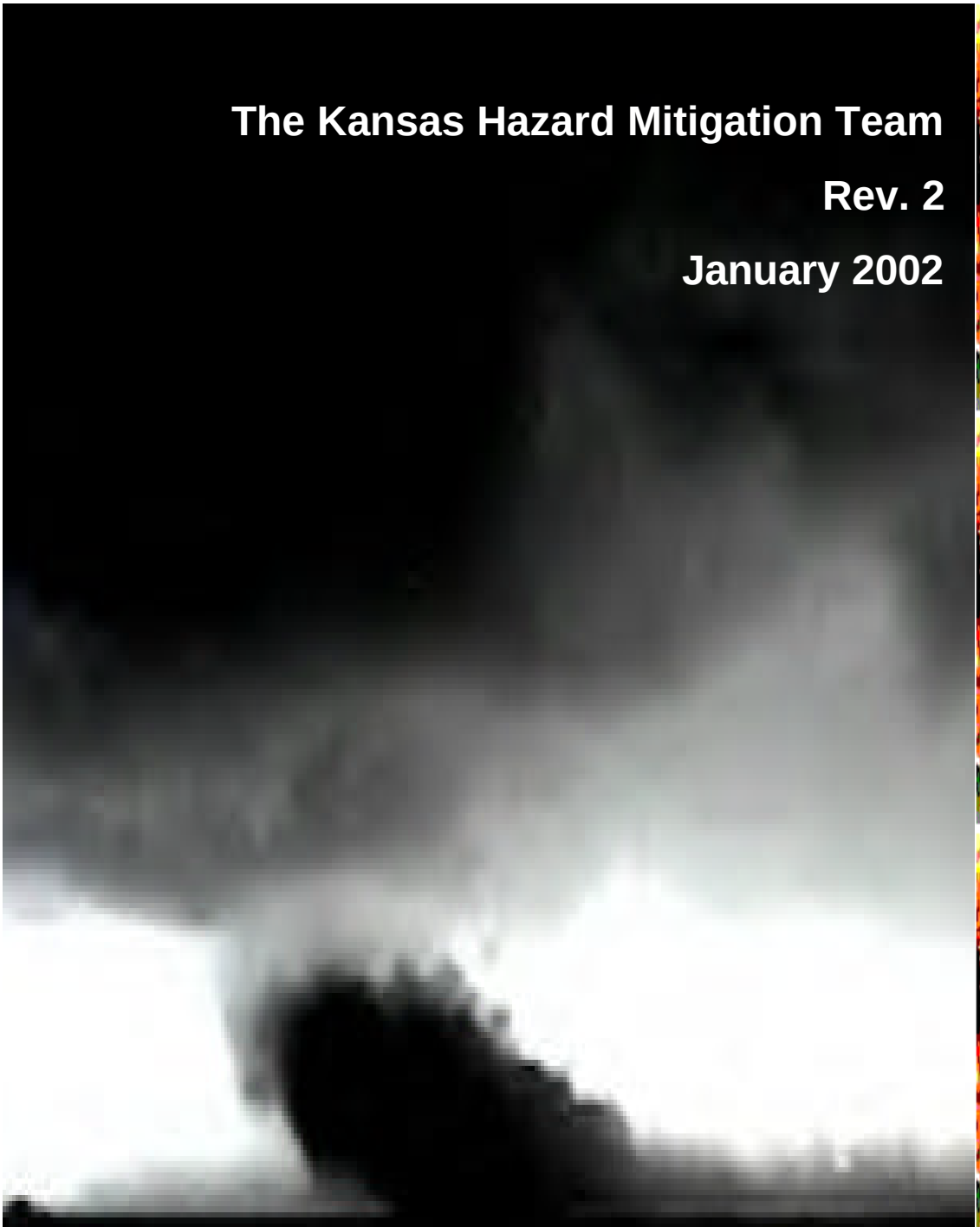
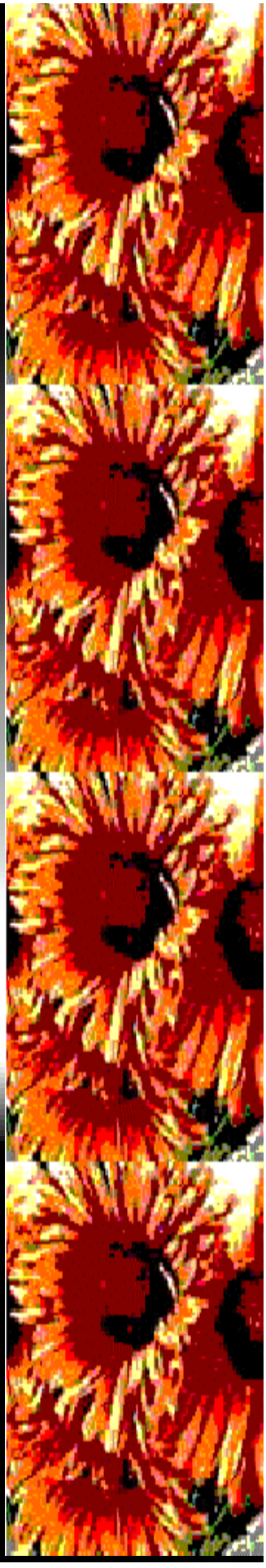




The Kansas Hazard Mitigation Team

Rev. 2

January 2002

The Kansas Hazard Mitigation Strategy

Part I

The Strategy

Introduction: *The Kansas Hazard Mitigation Strategy*

The State of Kansas has experienced a wide range of disasters throughout the years, and many of these have severely impacted the people, property and environment of the state. In more recent times, many different agencies and organizations at the state and local level have attempted to find ways to avoid or reduce these effects. While much has been accomplished, the communities of Kansas continue to be vulnerable to disasters.

This document is a comprehensive strategy developed by the state agencies of Kansas to create an effective, long-term approach to eliminate or reduce the vulnerability of Kansas' communities to the human, economic and environmental impacts of disasters. The document has been developed under the guidance of the Kansas Hazard Mitigation Team, a cooperative group of representatives of those state agencies that have the responsibilities, authorities or expertise necessary to develop, implement and maintain programs to accomplish such a goal. During the latter part of 2000, the Team has analyzed the many different types of hazards that threaten Kansas, and has defined the priority for addressing those hazards, based on the vulnerability of Kansas' people, property and environment. The Team undertook a planning process to identify organizational, management and technical programs and projects that, when implemented, would reduce or eliminate these vulnerabilities. These programs and projects are referred to as "*mitigation initiatives*" or actions "*taken to eliminate or minimize human, economic and environmental impacts prior to or following a disaster or emergency*."[1]

This document is the first edition of the Kansas Hazard Mitigation Strategy, which describes a long-term plan for state-level actions needed to improve hazard mitigation programming throughout Kansas in order to create a more "disaster resistant" state. With the process outlined in this strategy, the Kansas Hazard Mitigation Team can continue and expand past efforts to support local government efforts in hazard mitigation programming, and well as implement and monitor implementation of the new mitigation initiatives described herein.

The document records the planning process undertaken by the Kansas Hazard Mitigation Team. Because this is the first edition of the strategy, a brief overview of the planning process undertaken is presented. Then, the next section describes the strategy itself, detailing the organizational and procedural capabilities established to implement, maintain and expand the strategy. This is followed by an overview of the hazards that threaten the communities of Kansas, and the types of mitigation initiatives that can be implemented to eliminate or reduce the vulnerability to those hazards. Finally, a detailed management plan is given to define the specific actions to implement the strategy and the agencies responsible for those actions. Publication of this strategy is a major step towards a disaster resistant future for the State of Kansas.

Section 1.0: *The Purpose and Scope*

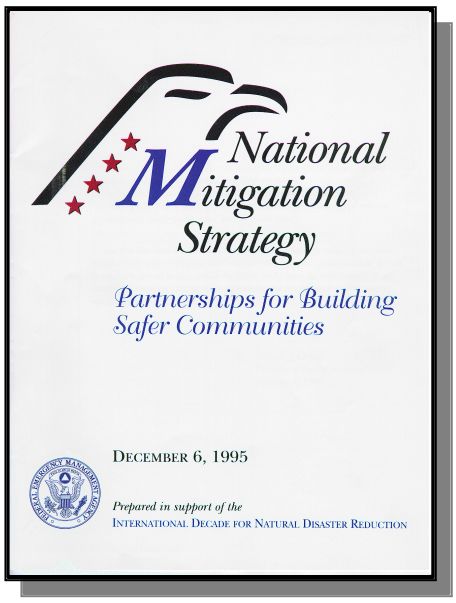
This section discusses the purpose of the Kansas Hazard Mitigation Strategy and how it is intended to relate to other existing mitigation plans and programs of Federal, state and local agencies. It also describes the structure and functioning of the Kansas Hazard Mitigation Team, and the current capabilities of the state agencies in mitigation programming. Lastly, it defines the policies and goals established for the strategy and its implementation by the Kansas Hazard Mitigation Team.

1.1 Purpose of the Strategy

The Kansas Hazard Mitigation Strategy is intended to fulfill many purposes. These include the following:

- Create a statewide vision for a disaster resistant future and define the state's goals for hazard mitigation programming,
- Provide an effective mechanism to promote interagency coordination of Kansas' many state agency programs related to hazard mitigation,
- Ensure that, on an ongoing basis, all the natural, technological and criminal hazards threatening Kansas are identified, evaluated and addressed with a priority reflecting the risk they pose to the community,
- Comply with the Federal requirements placed on several Kansas state agencies for statewide mitigation planning in a coordinated and integrated manner,
- Provide an effective mechanism to plan, budget, monitor and evaluate mitigation program efforts of involved state agencies,
- Educate state and local officials, as well as the public, regarding the hazards threatening Kansas, the vulnerabilities to those hazards, and methods to mitigate those vulnerabilities, and
- Establish and define programs and policies intended to improve mitigation planning and programming at the community level.

The Kansas Hazard Mitigation Strategy serves as a bridge between Federal and local mitigation programming development and implementation. It provides a mechanism to initiate, coordinate, and monitor implementation of the National Mitigation Strategy promulgated at the state and community level in Kansas, as well as various specific Federal programs and statutes related to hazard mitigation. The National Mitigation Strategy promulgated by the Federal Emergency Management Agency (FEMA) in December of 1995 to encourage a national focus on hazard mitigation. At the local level, the Kansas Hazard Mitigation Strategy guides the state's programs for identifying local mitigation programming needs, establishing and delivering state sponsored technical, financial and administrative support services, and encouraging development and implementation of local mitigation plans.



These purposes are reflected in the scope of the Kansas Hazard Mitigation Strategy and its relationships with other mitigation related plans and programs.

1.2 Vision for the Kansas Hazard Mitigation Strategy

One of the key purposes for the development, implementation and maintenance of the Kansas Hazard Mitigation Strategy is ensure that there is a single, statewide vision for hazard mitigation programming – a vision which provides a common understanding of the desired outcome of hazard mitigation efforts in Kansas. To this end, the KHMT has adopted this vision statement for the Kansas Hazard Mitigation Strategy:

> *"The communities, neighborhoods, businesses and institutions of Kansas will work together to minimize the disruption, damages, and degradation in the quality of life from any type of future disaster."*

Clearly, it is the intent of the KHMT to have both the public and private sectors actively involved in the state's communities to make Kansas more resistant to the impacts of future disasters and to protect the state's quality of life for its citizens through implementation of this strategy.

1.3 Authorization and Scope of the Strategy

The Kansas Hazard Mitigation Strategy is an integral component of state-level programs for management of disasters and their impacts. As such, the strategy relies on the authorities given to the programs and organizations herein incorporated for implementation of its strategies and assignments. Further, the strategy is intended to be consistent with and supportive of the policies, plans and implementation procedures that govern these

Destruction caused by the tornado that touched down in Parsons, Kansas April 19, 2000

related state agency policies and programs, and in the event of any inconsistency, the relevant state agency policies and programs supersede the provisions of the strategy in question. As such, the strategy relies upon and is intended to be consistent with the following:

Existing Kansas Statutes:

- Chapter 12, Article 7, allowing cities and municipalities to designate flood zones and restrict the use of land within these zones,
- Chapter 24, Article 12, establishing watershed districts,
- Chapter 31, Article 1, establishing the state fire marshal's office,
- Chapter 48, Article 9, promulgating the Kansas Emergency Management Act and establishing the Division of Emergency Management under the direction of the Adjutant General, and §48-929 requiring counties to establish and maintain a disaster agency responsible for emergency management and to prepare a county emergency response plan,
- Chapter 65, Article 33, allowing for the establishment of wastewater management districts and providing financial support for control of water pollution,
- Chapter 65, Article 57, promulgating the Kansas Emergency Planning and Community Right-to-Know Act, and establishing the state emergency response commission (The Kansas Commission for Emergency Preparedness and Response).
- Chapter 66, Article 18, promulgating regulations for utility damage prevention (the Kansas Underground Utility Damage Prevention Act.)
- Chapter 68, Articles 9 and 15, controlling the damming of water courses,
- Chapter 74, Article 26, establishing the Kansas Water Office and Kansas Water Authority and requiring the development of a state plan for water resources management,

Norland Plastics in Haysville was directly in the path of the tornado

- Chapter 82a, Articles 927 and 928, establishing long-range goals and objectives for the management, conservation, and development of the waters of the state and policies deemed desirable for their achievement.
- Chapter 82a, Articles 2, 3, and 4 governing the regulation and supervision of dams and other water obstructions, and ensuring public safety from dam failure,
- Chapter 82a, Article 6, allowing establishment of water supply districts,

Related state plans and procedures:

- The Kansas Comprehensive Emergency Management Plan, coordinated by the Kansas Division of Emergency Management,
- The Kansas Planning Standards, coordinated by the Division of Emergency Management,
- The Kansas Water Plan, coordinated by the Kansas Water Office, and
- The Kansas Strategy for Counter Terrorism Program Development.

In addition, the strategy also addresses requirements placed on the State of Kansas to develop and maintain statewide plans for hazard mitigation programming, including:

- Requirements for state planning pursuant to Sections 404, 409 and 322 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (P.L. 93-288, as amended), and
- Sections 553 of the National Flood Insurance Reform Act.

The strategy has consolidated the state planning requirements under these two Federal

Debris chokes the streets of Augusta, Kansas as residents begin cleaning up after the October floods.

laws to make the compliance process more efficient and timely for all involved organizations. The strategy also defines the state's mechanisms for participation in these programs and responsibility for coordination with the Federal Emergency Management Agency (FEMA).

Recent amendments to the Robert T. Stafford Act stipulate that, in order to receive increased Federal funding for eligible hazard mitigation initiatives, state, local and tribal governments must develop and approve a local hazard mitigation plan to promote methodical and effective mitigation programming. Upon its implementation, the Kansas Hazard Mitigation Strategy is intended to fulfill this purpose at the state level, as well as to provide the state with a management and coordination tool to achieve this goal at the local and tribal level.

Section 2.0: Organizational *Framework for the Strategy*

The development, implementation and maintenance of the Kansas Hazard Mitigation Strategy are under the direction of the Kansas Hazard Mitigation Team (KHMT). The KHMT is made up of representatives of the principal state agencies and statewide organizations with authorities, responsibilities or expertise related to hazard mitigation programming. The Kansas Commission on Emergency Planning and Response charters the KHMT. The charter for the KHMT stipulates its duties, membership and responsibilities, and is provided as Appendix One to this section of the strategy.

2.1 Organizational Responsibility

As noted in Appendix One, the organizational responsibilities of the KHMT are outlined in its charter, and include:

- Develop a statewide hazard mitigation program involving all levels of government,
- Determine of the capabilities of each state agency to address the hazards that threaten Kansas,
- Develop, implement and maintain a comprehensive state hazard mitigation plan,
- Establish teams to research, develop, and review specific policies or processes in-

Kansas: The middle of "tornado ally"

volved in increasing Kansas' capabilities to resist the impacts of future disasters, and
- Coordinate all hazard reduction programs.

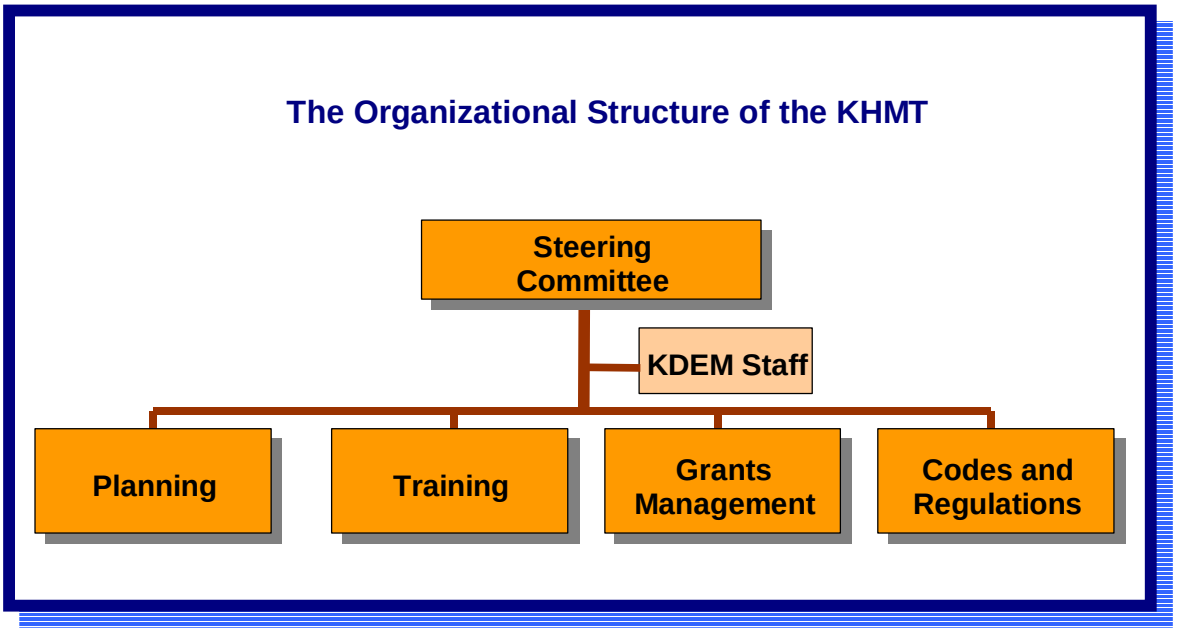
The Kansas Hazard Mitigation Strategy is intended to enable the KHMT to fulfill these mandates.

2.2 Organizational Structure

This document is the first edition of the comprehensive mitigation strategy developed by the KHMT. In preparing this document, the KHMT made several decisions regarding its organizational structure and functioning that are instrumental to implementation and maintenance of the strategy.

As noted in its charter, the KHMT is made up of both "core" state agencies that have general responsibilities and expertise for programming related to hazard mitigation, and other state agencies with specialized expertise or responsibilities that is likely to be needed for program development or implementation. Both core and specialized agencies have been actively involved in the development of this first edition of the strategy.

In order to facilitate implementation and continued expansion of the strategy, the KHMT has established a more formal organizational structure, expanding that specified in its charter in order to be more operationally oriented. The organizational structure developed is that illustrated here:



The committee structure of the KHMT does not supersede or in anyway alter the authorities; capabilities or responsibilities of the state agencies to implement the mitigation related programs that have been assigned by executive decision or statute to them. The committee structure is solely a mechanism to improve interagency coordination of existing programs, to identify the need for new programs, and to assure implementation of the strategy.

The responsibilities of each of the committees of the KHMT can be summarized as follows:

The Steering Committee -- provides coordination of the overall effort to develop, implement and maintain the Kansas Hazard Mitigation Strategy, making the necessary decisions to implement the various programs and to act on the recommendations of the established committees. The Steering Committee is under the direction of the Chair and Vice Chair of the KHMT, who are the authorized spokespersons for the KHMT. All of the other committees report to and are coordinated by the Steering Committee.

In accord with the charter of the KHMT, the Kansas Division of Emergency Management provide staff support to the organization, by setting meeting schedules, preparing agendas, reporting on meetings, preparing reports and other documents for the KHMT, and maintaining the KHMT's database for tracking implementation of the strategy.

The Planning Committee -- assumes responsibility for the interagency coordination of the technical analyses necessary to implement and continue of the strategy, as well as for the coordination of agency's technical, managerial and administrative programs necessary to achieve the objectives established for the strategy.

The Training Committee -- provides interagency coordination of existing or new state training, education and exercise programs related to hazard mitigation. The Training Committee assures that state training programs in mitigation are comprehensive, consistent among agencies, and reach the audiences in need of such information and guidance.

Landslide damage to a Kansas highway

The Grants Management Committee -- is responsible for interagency coordination of financial support programs related to hazard mitigation. Various state agencies manage several state and federal grant programs that can be used for implementation of mitigation initiatives. This committee assures that the application process is effective and efficient, that the state maximizes the use on matching funds, and that grants made reflect the priorities set by the Kansas Hazard Mitigation Strategy.

Codes and Regulations Committee -- Development of enhanced mitigation capability at the state and local level frequently requires application of various types of codes and regulations to guide development and the use of resources. Kansas State agencies are responsible for the implementation of several such programs, and for assisting local agencies and organizations to do so as well. This committee of the KHMT serves to coordinate state agency programs to develop and implement mitigation related codes and regulations, to investigate the need for additional mitigation codes and regulations, and to assure adequate enforcement of codes and regulations, once promulgated.

As necessary, and at the discretion of the chair of any committee, temporary or ad hoc subcommittees can be established to address specific issues or concerns, and the membership of these temporary, ad hoc committees will be designated by the committee chair at the time they are established.

Because this is the first edition of the strategy, during Fiscal Year 2001, the KHMT will be in the process of staffing the committees and coordinating their assignments and responsibilities. This is reflected in the assignments made to KHMT members in the FY 2001 management plan, incorporated into this strategy. This effort is outlined in the FY 2001 management plan that is a part of this document.

2.3 Organizational Capabilities

The authorities, expertise and capability of the KHMT to implement and support mitiga-

"Dust Bowl" days in Kansas

tion programming are provided by its member agencies. This section briefly summarize the capabilities of each of the key KHMT agencies to support the activities of the KHMT and to undertake the various implementation strategies and assignments identified in this strategy. (Key agencies are described in alphabetical order.)

2.3.1 *Information Network of Kansas, Inc.*

Information Network of Kansas (INK) was created by an act of the Kansas State Legislature in 1990 for the purpose of providing equal electronic access to state, county, local and other public information to the people of Kansas. INK provides Kansans equal access to governmental data via the Internet. INK partners with state agencies to provide a user-friendly Internet "gateway" for citizens to access the government services. Because many of the implementation mechanisms for the Kansas Hazard Mitigation Strategy rely on the sharing of mitigation-related data and information via the Internet, INK is an important support agency for the effort.

2.3.2 *Kansas Corporation Commission*

The Kansas Corporation Commission is designated to be a support agency for the KHMT, and the organization's mission is to protect the public interest through regulating electric, gas and telecommunications services, and ensuring the service availability and safety of these utilities. It also regulates rates for common carriers, motor carriers, and oversees oil and gas production in the state by protecting correlative rights and environmental resources. Of interest to the development and implementation of this strategy are the Commission's roles in assuring the adequacy of energy and telecommunication services, as well as its program to manage the risk to damages to underground utilities.

The KHMT has identified failure of utilities and the infrastructure as one of the significant hazards that threatens the state. Applicable to this concern is the duty of the Kansas

Subsidence damages a Kansas railroad

Corporation Commission to assure the adequacy of electric power. The Commission monitors the availability of electric power in the state, with the objective of ensuring the adequacy of the supply to future needs, including for economic development purposes[2], which is very important to mitigating impacts on the economic vitality to the communities of the state.

As a part of its telecommunications program management responsibilities, the Commission has established an enhanced 911 system task force to formulate a strategy for funding and deploying wireless emergency telephone services.

The Commission also is responsible for gas and liquid fuels pipeline safety in the state, and has in place programs and procedures for prevention of damage to underground utilities, for promoting safety for natural gas pipelines, and for receipt and response to pipeline accidents. The Commission has established a task force to evaluate problems and programs for protection of underground utilities. The Commission also has programs in the identification and plugging of abandoned oil and gas wells, as well as site remediation when necessary.

2.3.3 Kansas Department of Agriculture

Of the branches of the Kansas Department of Agriculture (KDA), the responsibilities and authorities of the Division of Water Resources are, at this time, the most instrumental to the support of the KHMT. The Division of Water Resources has two groups: the Structures Group and Water Rights Group, and these have authorities and responsibilities

A farm near Winfield, Kansas was damaged when a river changed course through a failed levee

important to mitigation of three hazards of concern to Kansas: flooding, dam safety, and drought.

The KDA is one of the "core agencies" of the KHMT, and the Structures Group in the Division of Water Resources serves as the state's manager for implementation of the Federal National Flood Insurance Program (NFIP) and the associated Community Rating System (CRS). As a part of this, the Division is assuming responsibility from the Federal Emergency Management Agency (FEMA) for implementation of the program to prepare Flood Insurance Rate Maps (FIRM) that delineate the boundaries of flood plains. In this capacity, the Division provides training for local flood plain managers and actively supports the Kansas Flood Plain Managers' Association.

The Structures Group of the Division also has state authority to regulate and permit projects that fill in portions of the 100 year flood plain or watershed larger than 160 acres and could thereby impact the size or extent of flood inundation areas. Accordingly, this group is responsible for permitting dams that result in creation of inundated areas of more than 30-acrefeet. Kansas is second in the nation for the number of dams, with about 150 older dams and about 400 dams identified as "high hazard" due to the level of development in the downstream inundation areas. High hazard dams are to have plans prepared and maintained for emergency response to protect public safety in the event of a dam break. However, these plans for most high hazard dams have not yet been developed. The Division is also currently conducting an inventory of dams, but experiences a backlog on dam inspections due limited staff resources.

The Structures Group also has staff designated to address issues involving levees constructed in the state for flood control. Currently, the flood control capabilities of some levees are being reassessed to ensure that they continue to offer adequate protection. It is possible that some levees will be found to not be high enough to protect to the base flood elevation. This could result in areas behind the levee being reclassified as vulnerable to flooding, and many have experienced substantial development since the levees were constructed. Levee construction is also undertaken by farmers to protect agricul-

Flood and drought: Kansas' Historical Hazards

tural fields from inundation.

The Water Rights Group exercises state authority to issue permits for water use that allocate withdrawals of both surface and ground water. Allocations are based on the "driest year" and the Chief Engineer for the Department has the authority to curtail or prohibit withdrawals during drought periods.

Both the Structures Group and the Water Rights Group have authorities for inspection and enforcement authority for construction and water withdrawal permitting, but staff resource limitations have resulted in backlogs for needed inspections.

2.3.4 *Kansas Division of Emergency Management*

The Kansas Division of Emergency Management (KDEM) is one of three divisions housed within the Kansas National Guard, along with the Air Guard and Army Guard. KDEM is a core agency of the KHMT and has important responsibilities for development and implementation of the Kansas Hazard Mitigation Strategy. KDEM is designated to provide staff support to the KHMT, and in this capacity is responsible for maintenance of the strategy documentation and management system database. KDEM has four sections: Planning, Training, Administration, and Technological Hazards, all of which are important to implementation and maintenance of the strategy. The KDEM staff is located in the Topeka headquarters office.

The KDEM Planning Section is responsible for programming in public assistance after a disaster, hazard mitigation, emergency planning, and KDEM's role in counter terrorism programming. The Planning Section also manages Severe Weather Awareness Week, support to emergency plans for residential care facilities, safe room planning for schools, FEMA's readiness assessment program, and maintenance of KDEM's webpage. The Section also serves as KDEM's liaison role to KDA for dam safety and KWO for the State Water Plan.

Under state law, each Kansas county must prepare and maintain a comprehensive emergency management plan in accord with standards issued by the Planning Section of KDEM. These standards are entitled the "Kansas Planning Standards," and are used by KDEM's Planning Section to review county plans on a five year rotating cycle. About 20% of the counties have a currently approved plan. The Kansas Planning Standards also have requirements for planning for hazardous materials emergency under the Kansas Emergency Preparedness and Community Right-to-Know Act and for local mitigation programming

The Planning Section is responsible for the administration of the Federal Hazard Mitigation Grant Program (HMGP) in Kansas. This program makes available 75% Federal matching funds to support implementation of mitigation initiatives. The state's number one priority for expenditure of HMGP funds has been to purchase and remove vulnerable facilities from the flood plain. The Planning Section, under HMGP, has gathered a very preliminary list of potential mitigation projects for local implementation. A list of current HMGP programs is provided in Appendix Two to this section. "Project Impact" is a nationwide program originated by FEMA that is managed and coordinated by KDEM in Kansas. In this program, Federal "seed money" is provided to stimulate public and pri-

Tornado damages

vate interest in community-level hazard mitigation programming. Local jurisdictions are designated as Project Impact communities and a public – private partnership is established to identify, sponsor and implement mitigation projects. There are currently five designated Project Impact communities in Kansas, and KDEM has provided funding to these communities for development of local mitigation plans, although no comprehensive set of mitigation planning criteria are available. KDEM is planning to expand the Project Impact experience to other communities in the state.

The Technological Hazards Section is responsible for KDEM's programs in hazardous materials and radiological emergency preparedness for the Wolf Creek Nuclear Generating Station. The Technological Hazard Sections receives notifications from hazardous materials facilities pursuant to the emergency preparedness requirements of the Kansas Emergency Preparedness and Community Right-to-Know Act. (KDHE receives notifications made under the right-to-know provisions of this law.) This section is also responsible for receipt of the risk management plans submitted by covered hazardous materials facilities in Kansas, pursuant to Section 112 R of the Federal Clean Air Act Amendments. To date, the section has not had the resources to fully utilize these plans for mitigation enhancements at the local level.

The Training Section of KDEM sponsors the training programs made available through FEMA. Training programs in hazard mitigation planning or programming are limited, although training in business continuity planning has been conducted. KDEM holds an annual statewide training exercise.

The Administration Section includes the Operations Branch, which coordinates the state's emergency response operations at the time of a disaster. KDEM is also responsible for the activation and operation of the state's emergency operations center, which is located at KDEM's offices in Topeka. KDEM has recently established the "State Agency Response Team," which will be responsible for continuing development of the state's capabilities in emergency response operations

Beyond KDEM, the Kansas National Guard itself is active in emergency response operations and has established a "Scout Program," which places a trained liaison Guardsman in each county to improve emergency response operations. The Guard, to date, has had only limited involvement in mitigation programming, except through that conducted by KDEM.

2.3.5 *Kansas Department of Health and Environment*

The Kansas Department of Health and Environment (KDHE) is designated as a core member of the KHMT, and holds several program responsibilities that are important to the implementation and maintenance of this strategy. KDHE has four divisions: Laboratories, Environment, Heath and Statistics. Of these, several programs and capabilities within the Divisions of Environment and Health are the most involved in the development, implementation and maintenance of this strategy.

Water contamination has been identified by the KHMT as a hazard threatening the people, property and resources of Kansas. The KDHE has the lead role in addressing this hazard. The agency has programs in surface water quality monitoring, permitting and regulation of discharges, protection of drinking water and livestock waste management. In order to support efforts to avoid water contamination, improve water quality, and protect drinking water, the KDHE also administers the Kansas Water Pollution Control Revolving Loan Fund and the Public Water Supply Loan Fund. Through these, Kansas' communities can finance water pollution control projects through low interest loans.

Another source of water contamination is pollutants leaching from older landfills and hazardous waste disposal sites into ground water supplies. KDHE is responsible for overseeing the solid and hazardous waste management issues and in sponsoring waste reduction and waste recycling programs as a means to mitigate this environmental impact.

Technological hazards are a concern in many parts of Kansas

"Kansas Environment 2000." Dansas Department of Health and Enviroment

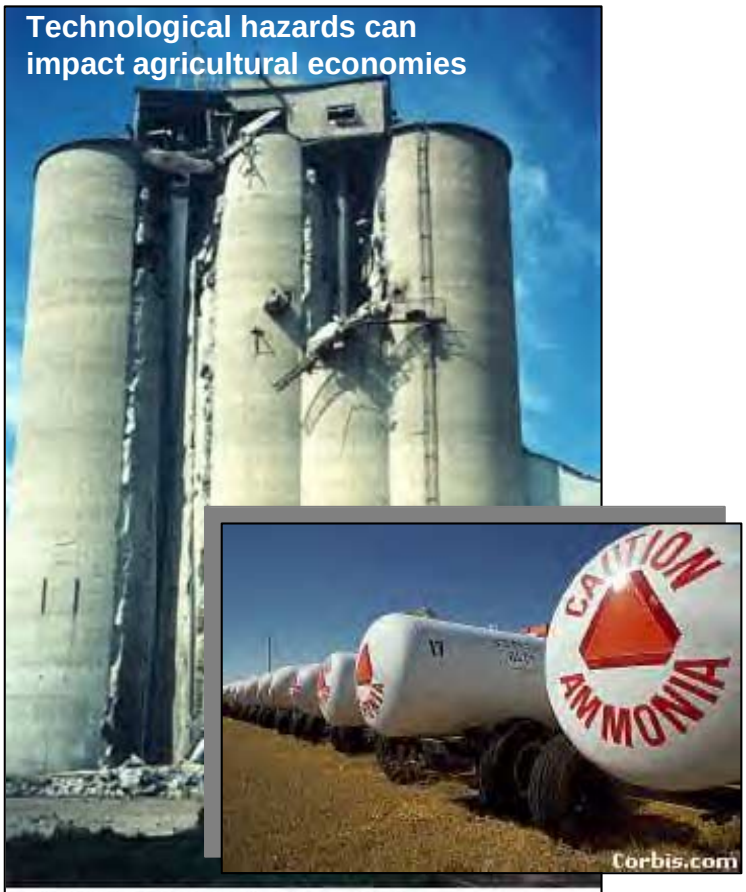
dress mitigation of ground and surface water contamination, either directly or indirectly.

Another hazard recognized by the KHMT is that from terrorism. KDHE has a significant role in developing the capabilities of Kansas to manage a terrorist incident involving biological weapons of mass destruction. KDHE is working with the Kansas Highway Patrol (KHP) in the development of plans, training and equipment purchase for dealing with biological agents used as weapons. KDHE is also cooperating in the implementation of the statewide survey of health care providers to assess the current capabilities to respond to a weapon of mass destruction incident.

As a part of KDHE's air quality programs, the agency is responsible for permitting emissions from stationary sources pursuant to the Clean Air Act, through the Kansas Emission Inventory Program. The agency is also responsible for management of data generated by the Toxic Release Inventory, pursuant to Section 313 of the Superfund Amendments and Reauthorization Act. Both these data gathering and management programs are indicating reduced pollutant releases to the environment.

2.3.6 *Kansas Department of Human Resources*

The Kansas Department of Human Resources has been designated as a support agency for the KHMT, and its programs in industrial health and safety are important to the development and implementation of this strategy. Within these programs, the agency's staff inspects facilities and investigates industrial accidents, as well as provides training and information to facility owners. The agency is involved in continuing education training for professionals involved in industrial health and safety.



South end of damaged grain elevator

The KDHR also has responsibility for management of the program to provide Disaster Unemployment Assistance to those victims of disaster who lost their jobs or income due to the event. This program indirectly mitigates the economic impacts of a disaster.

2.3.7 *Kansas Department of Commerce and Housing*

The Kansas Department of Commerce and Housing (KDOCH) is one of the core state agency members of the KHMT, and has responsibility of several key federal and state programs related to hazard mitigation. KDOCH has responsibility for state implementation of FEMA's Flood Mitigation Assistance Program (FMAP), the unmet needs program of the US Department of Housing and Urban Development (HUD) and HUD's Community Development Block Grant (CDBG) program. All of these programs are instrumental in the implementation of the Kansas Hazard Mitigation Strategy and the further development of Kansas's hazard mitigation capabilities.

The FMAP program provides for Federal planning and project grants to address flood hazards. The planning grants are used to fund local planning efforts to develop comprehensive flood mitigation plans. These plans, in turn, identify flood mitigation projects that, when implemented, will reduce the community's or neighborhood's vulnerability to floods. KDOCH attempts to combine different funding sources with available FMAP project moneys to make it feasible to fund larger flood mitigation projects than would otherwise be possible with FMAP funds alone.

The FMAP project grants, along with HMGP and HUD grants, noted above, are one way that KDOCH is able to support mitigation programming for designated repetitive flood loss properties. These properties are structures insured under the NFIP program, noted above, that have experienced two flood loss claims in the last 10 years, thus making

Like every disaster, the impact of tornadoes is very personal

them a high priority for flood mitigation. KDOCH is responsible for efforts to meet the mitigation requirements of repetitive flood loss properties. Current HMGP projects is listed in Appendix Two to this section of the strategy.

Much of the "unmet needs" funding from HUD has been used by KDOCH to also fund removal of vulnerable properties from the flood plain.

The CDBG program is a competitive grant process that has about $20 million per year in funding. About half of this goes to support development of community facilities and water and sewer projects. About 40% of the funds go to economic development programs for businesses and about $800,000 to imminent threat projects, of which disaster recovery projects are typical. KDOCH makes about 57 total grants per year.

In addition to administering federal grant programs directly or indirectly related to hazard mitigation, KDOCH also is responsible for state sponsored programs that offer a potential vehicle for reducing vulnerabilities to future disasters.

For HUD programs, there are six direct entitlement municipalities in Kansas; Johnson County, Kansas City, Wichita, Topeka, Lawrence, Leavenworth and Overland Park, the rest of the state is administered through KDOCH. The state and each of the six municipalities prepare an annual plan for expenditure of the Federal funds.

KDOCH operates the "Main Street" program which is funded through the state lottery. In this program, cities get technical assistance, including a program called "incentives without walls" which are structural grants for $15,000 to revitalize downtown areas. The agency would like to include a "disaster resistant businesses" in the Main Street program.

KDOCH's Community Service Program uses tax credits given to local non-profit organizations that they can, in turn, sell to private businesses. There is an annual competition for the best program, and the sale of tax credits is intended to stimulate private investment in the community.

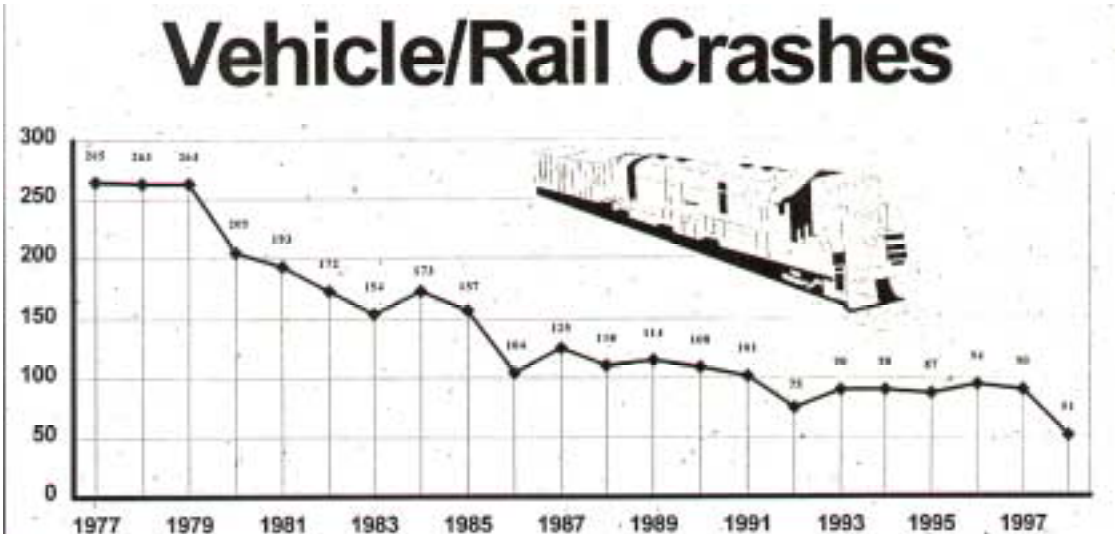
- **Riley County/City of Manhattan**
- **Johnson County**
- **City of Kinsley**
- **Butler County**
  - ✓ **Cities of Andover, Augusta, Benton, Cassoday, Douglass, Elbing, El Dorado, Latham, Leon, Potwin, Rose Hill, Towanda and Whitewater**
- **Sedgwick County**
  - ✓ **Cities of Wichita, Andale, Bel Aire, Bentley, Cheney, Clearwater, Colwick, Derby, Eastborough, Garden Plain, Goddard, Haysville, Kechi, Maize, Mount Hope, Mulvane, Park City, Sedgwick, Valley Center and Vida**

2.3.8 *Kansas Information Technology Office*

The Kansas Information Technology Office (KITO) is located in the Kansas Department of Administration, and is responsible for developing policies, architecture, and methodologies to be used for monitoring agency information technology activities. KITO also supports the Kansas Geographic Information System (GIS) policy board. Several components of the Kansas Hazard Mitigation Strategy rely on interagency cooperation in gathering, processing and sharing data and information, in both GIS and other formats. The KITO will support these types of operations by the KHMT.

2.3.9 *Kansas Department of Transportation*

The Kansas Department of Transportation (KDOT) is responsible for providing a statewide transportation system to meet the needs of Kansas, and is designated as a core member of the KHMT. KDOT is responsible for the Kansas State Highway System and has jurisdiction for over 10,000 miles of roadway, which supports 52% of the vehicular travel in the state. The State Highway Program has four principal areas of activity: Maintaining roadways ("Substantial Maintenance Program"); Service and safety improvements ("Major Modification Projects"); Replacing or rehabilitating bridges ("Priority Bridge Program"), and; Highway system expansions or enhancements ("System Enhancement"). KDOT also implements a Local Transportation Program that provides state and Federal funding to local governments for roadway development, maintenance and improvement. KDOT also is responsible for the Kansas Airport Improvement Program, the Rail Service Improvement Fund, and a program of funding for public transit.



Kansas Dept. of Transportation, Annual Report, January 2000

There are many aspects of KDOT's program activities that are relevant to hazard mitigation programming and the implementation of this strategy. As the principal agency responsible for the transportation infrastructure in the state, KDOT's efforts to make the highway network less vulnerable to the impacts of disasters are critical to maintaining the vitality of regional and local economies, and to assuring continued transportation capability during and after disasters. In addition, KDOT's safety improvement programs are targeted on preventing or reducing the human injury and property loss.

KDOT's Motorist Assistance Program, Road Condition Reporting System, and the Highway / Rail Safety Crossing Programs are making an important contribution to improved motorist safety. There are 7,200 at grade rail / roadway crossings in Kansas, and KDOT's efforts to mitigate this safety hazard have been beneficial. Other KDOT safety-related projects include studies on the characteristics of high-accident locations to identify needed corrective actions, making emergency roadway and bridge repairs, and improving signing, pavement marking, and lighting.

The agency's Corridor Management Program strives to balance traffic and access management with land use management, and are important to protect public safety, public investment in the highway system and private investment in property development on adjacent lands. The goal of corridor management is to create and preserve safe, efficient, and economically viable transportation corridors.

KDOT's program activities are also relevant to strategy implementation because of the direct and indirect costs that could occur due to the impacts of disasters on the transportation network. Very substantial public funds have been invested in the transportation

Wildfire: A Kansas hazard

network, and programs for mitigation of disaster caused damages to the network will result in significant savings in the future.

2.3.10 *Kansas Fire Marshal*

The Kansas State Fire Marshal's Office is dedicated to protecting the citizens of the State of Kansas and to reducing deaths, injuries and property losses from fire, explosion, and hazardous materials through inspection, enforcement, regulation, investigation, hazardous material incident mitigation, data collection and public education. The Fire Marshal is designated as a supporting agency to the KHMT.

Key programs of this agency related to hazard mitigation are considered to be those related to fire prevention and hazardous materials risk management and incident mitigation. The fire prevention program focuses on structure inspection to ensure compliance with the Kansas Fire Prevention Code. In this program, the State Fire Marshal's Office works with local authorities having jurisdiction. In addition, the Fire Prevention Division regulates the storage of highly flammable materials, oversees businesses involved in selling fire extinguishers, alarms and sprinkler systems, and regulates fire manufacturers and displays.

Recently, the agency has initiated development of a hazardous materials regional response program to improve the capabilities of the state to respond to hazardous materials accidents. Six response regions are planned. Regional response teams with enhanced capabilities are to be designated, trained and equipped. A training committee is also being established to promote development and delivery of hazardous materials awareness, operations, and technician training courses.

2.3.11 *Kansas Forest Service*

The primary mission of the Kansas Forest Service that is related to the Kansas Hazard Mitigation Strategy is its role in timber management as an industry vital to the state's economy, as well as its programs in rural fire prevention and suppression for wildfire risk

Wildfires: A Kansas hazard

management.

Timber is a $75-100 Million per year contribution to the state's economy, and the KFS provides services to ensure the vitality of this economic sector. KFS maintains list of timber buyers and sawmills for use when needed; including after a disaster when there is a need for quickly find markets for damaged timber. The Service, upon request, can help prepare management plans for landowners, and prepare harvest and planting plans. However, the small staff of KFS limits this activity.

Of interest to the agency is the importance for additional public education on wildfire risk management and the need to provide additional training in wildfire prevention and suppression. In the latter case, improved education for ranchers in the potential hazards of controlling rangeland fires intentionally set to improve pasture conditions is needed. This type of fire is a major cause of wildland fires in Kansas

The agency also is striving to map the "urban interface" between developed areas and wildlands, where wildfires can cause the most property damage. Mapping of the urban interface would enable subsequent efforts to identify landholders in these areas, to provide them wildfire mitigation educational materials, and to promote local codes and regulations for enhancement of wildfire prevention and mitigation.

2.3.12 *Kansas Geological Survey*

The Kansas Geological Survey (KGS) is housed in the University of Kansas, and has sections for ground water hydrology, geologic investigations (mapping, resources, and hazard studies), petroleum research, exploration services (geophysical research), mathematical geology section (statistics), mineral exploration group (sand, gravel, etc.), and the Data Access and Support Center (DASC). DASC is the repository for geo-

Landslides: A Kansas hazard

graphical information system (GIS) based information and data for the State.

The KGS has produced reports on earthquakes, land subsidence, landslides, and other hazard related topics, and one of its principal responsibilities for the KHMT is to make technical data and analyses available to other state agencies for their programming. The Geohydrologic Section of KGS monitors ground water quality and has data available. Recently, the KGS has issued a paper on the need for a geologic hazards program in Kansas[3]. In addition, KGS is involved in a landslide-mapping project of rapidly developing areas around Kansas City as a pilot project. The intent is to produce maps delineating geologic hazard areas for the portions of the Kansas City metropolitan area inside of Kansas.

2.3.13 *Kansas Highway Patrol*

The Kansas Highway Patrol (KHP) has an Emergency Services Branch that is responsible for the emergency preparedness functions assigned to this agency. Key to the Kansas Hazard Mitigation Strategy is the KHP's role as the lead administrative agency for the state's activities under the US Department of Justice national counter terrorism program. The KHP is currently coordinating planning and equipment purchase programs under this grant, and has formulated a statewide counter terrorism program strategy. Accordingly, the KHP has established a "Kansas Domestic Terrorism Working Group" of state agencies, with state and local law enforcement holding primary responsibility for terrorism vulnerability and threat assessment.

In other activities, the KHP promotes school emergency planning in cooperation with other state agencies. The KHP is also closely involved with the radiological emergency preparedness planning activities for the Wolf Creek Nuclear Power Plant, as well as within a emergency planning area for a nuclear power plant in Nebraska.

The KHP is also actively involved in monitoring hazardous materials transportation on

state highways, and routinely operates a vehicle safety inspection program for hazardous materials transporters and maintains a database with the derived information.

2.3.14 *Kansas State Historical Society*

Like any other structure or location, disasters can impact historic and archaeological sites and mitigation of their vulnerabilities is a concern to the KHMT. Kansas has over 700 sites listed on the National Register of Historic Places, and 120 different sites listed on the state register of historic places. These are vulnerable to the impacts of disasters and several have been damaged in past events[4]. The Kansas State Historical Society serves the KHMT in as a designated core member, with the State Historic Preservation Officer (SHPO) serving as the representative to the team. The State Historical Society has a Cultural Resources Division, with a Preservation Office and an Archaeological Office. The Society has established a designated "disaster assistance staff" for helping libraries offering assistance after disasters. Similarly, other organizations help to mitigate cultural resources damage after disasters. The Kansas Museums Association has trained staff members that are able to help small museums after a disaster. There is also a volunteer group, the Kansas Disaster Recovery Assistance Network, established to coordinate response to damage to printed documents, records, books and photographs, and has primarily assisted libraries in their recovery after disaster events.

The SHPO is working with the Kansas Department of Transportation (KDOT) to build a geographic information system (GIS) with emphasis on locating archaeological sites to promote their protection. Ten thousand sites have been entered into the SHPO's database.

Kansas and the "Dust Bowl" Days

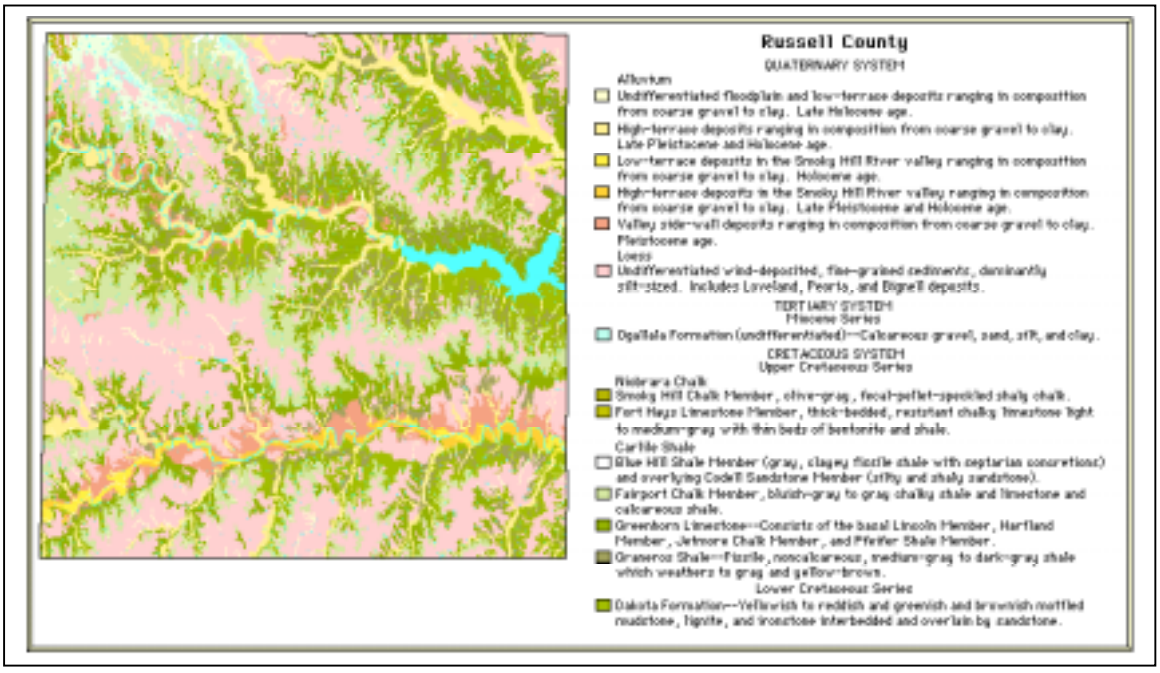
The SHPO has responsibilities for historic review of structures to be removed from flood plains in flood mitigation programs. The SHPO also has responsibility for a grant program, the Heritage Trust Fund, which is available for rehabilitation of any historic building on the state or national register. Annually, $600,000 to $800,000 currently is expended, with a required 20% local match. Window and roof repairs are common projects funded, for it is the intent of the program to keep a “sound envelope” for the historic structure. These grant funds are often consolidated with other funding sources.

2.3.15 *Kansas Conservation Commission*

The Kansas Conservation Commission (KCC) works with the 105 local conservation districts, the 86 organized watershed districts and state and federal agencies, to administer programs that improve water quality, reduce soil erosion, conserve water and reduce flood potential. The protection and enhancement of Kansas´ natural resources are addressed by a number of agencies and organizations that may differ in purpose and method but have the same goal. The Kansas Conservation Commissions financial assistance programs are supported with technical expertise provided by the USDA, Natural Resources Conservation Service with local government and administration provided by the 105 Kansas Conservation Districts. Together, these organizations provide the availability of financial assistance; local governance and technical designed to ensure Kansas´ natural resource concerns are addressed effectively. The SCC programs for financial assistance in water resource protection are an important component of implementation of the Kansas Hazard Mitigation Strategy.

2.3.16 *Kansas State University Extension Service*

The Kansas State University Agricultural Experiment Station and Cooperative Extension Service (KSU Ext.) has personnel in 105 county offices, 9 experimental fields, 5 area offices, 3 research centers and 3 research – extension centers. KSU Ext. delivers educational programs and technical information to enhance the economic viability and quality



of life in Kansas' communities. The organization's Natural Resources and Environmental Management program strives to protect the environment and conserve natural resources, particularly soil and water, by providing information about conservation techniques. The main emphases of this program is to ensure quality and conservation of surface water and groundwater, promote community and residential environmental management, and develop systems for improved soil and air quality. The educational and technical skills that the organization can deliver throughout Kansas at the community level are very important to the implementation of the Kansas Hazard Mitigation Strategy.

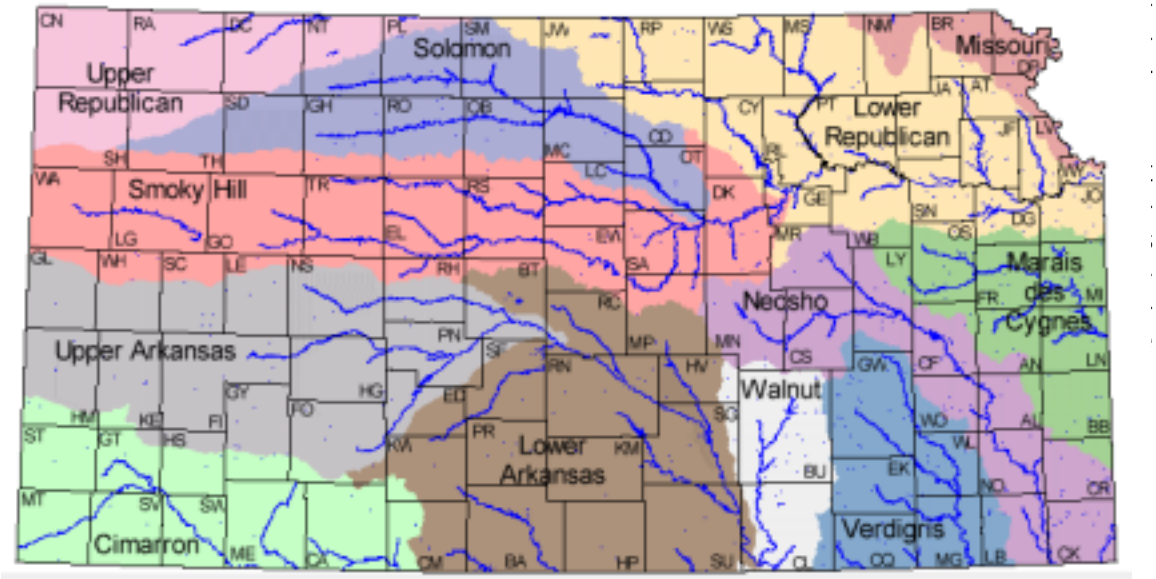
2.3.17 *Kansas Water Authority and Kansas Water Office*

The Kansas Water Office (KWO) is designated as a core member of the KHMT due to its role in the coordination of water resources management programs and its capabilities to support mitigation programming in flood and drought control, as well as water quality maintenance. As required by state law, the KWO prepares an annual State Water Plan for the management, conservation and development of the water resources of Kansas.

The Kansas Water Authority is within and a part of the Kansas Water Office. It is responsible for advising the Governor, the Legislature and the Director of the Kansas Water Office on water policy issues, for approving the Kansas Water Plan and revisions thereto, for approving water storage sales, Federal contracts, administrative regulations, and legislation proposed by the Kansas Water Office.

The Kansas Water Plan is organized into nine policy sections and twelve basis sections, and many of the provisions of the plan are directly relevant to the implementation of the mitigation programming to be coordinated through the Kansas Hazard Mitigation Strategy.

Policy sections of the Kansas Water Plan are: 1] public water supply; 2] water conservation; 3] water rights management; 4] water quality; 5] flood management; 6] wetlands and riparian lands management; 7] water-based recreation; 8] data and research and 9] public information and education. In a manner similar to that intended for this strategy,



Kansas River Basins

The KWO has responsibility for other programs that are instrumental in the mitigation of drought by striving to ensure the adequacy of the state's water supplies. In its "Water Marketing Program," the KWO contracts with municipal and industrial water users to provide water storage in Federal reservoirs. Twenty-three public water suppliers hold water marketing contracts with the state. Several sell water to secondary suppliers. Several industrial water users also hold contracts.

The KWO also is responsible for operation of the related "Water Assurance Program" which allows state coordinated operation of state-controlled water storage space in Federal reservoirs to satisfy downstream water rights during drought conditions. The KWO also is partially responsible with the State Conservation Commission (SCC), for the "Multipurpose Small Lakes Program" through which flood control reservoirs provide water supply for smaller communities. This allows the state to contract with small communities to provide water supplies from the same reservoirs that are also meeting flood mitigation needs.

2.3.18 *Regional and Local Water Resource Management Organizations*

The agencies of the State of Kansas are assisted in their efforts to effectively control water resources through regional and local water resource management organizations. The capabilities of these groups to participate in the Kansas Hazard Mitigation Strategy is summarized in this section. From the state level, the KDA, KDHE, SCC and KWO work with these regional and local organizations on a regular basis.

About forty percent of the state is encompassed by watershed districts, which are formed primarily to cooperate on flood control efforts within a watershed. Watershed dis-

Tornado damages

tricts have taxing powers to support program implementation, and also cooperate on efforts to control erosion, sediment and water supply within the watershed.

Watershed districts are assisted by the State Conservation Commission, which financially supports dam construction. The Commission also assists the watershed districts in preparing watershed development plans, which are a requirement for receipt of Commission funding.

There are also Conservation Districts, Rural Water Districts, Public Wholesale Water Supply Districts and Drainage Districts. The Drainage Districts are the former levee authorities who have a taxing authority. All of these local and regional water management organizations have a potential role in the future expansion and implementation of the Kansas Hazard Mitigation Strategy.

2.3.19 *Other State Agencies and Statewide Organizations*

There are additional core and supporting agencies listed in the KHMT Charter that have not yet been active participants in the development of this initial edition of the Kansas Hazard Mitigation Strategy. As the KHMT initiates implementation of the strategy and revises it in future years, it is intended that these agencies and organizations will also become active participants in the planning process, lending their capabilities and responsibilities to reducing the vulnerability of Kansas to future natural, technological and criminal hazards.

Section 3.0: *Policy Framework for the Strategy*

This section describes the policy framework within which this initial edition of the Kansas

Haysville tornado impact
The Witchita Eagle

Hazard Mitigation Strategy has been developed and will be implemented in its first year of operation. The policy framework consists of the existing statutes and requirements considered applicable to the strategy, and those developed by the KHMT to guide the strategy's development and implementation.

3.1 Existing Mitigation Policies

The current policy framework for development of the initial edition of the strategy is defined principally by the existing statutory requirements promulgated by the state, those Federal requirements exerted on the state for hazard mitigation planning, and the policies placed on current hazard mitigation programming by the KHMT.

3.1.1 *Current Federal Policy Framework*

This strategy has been prepared in accord with Federal requirements and policies applicable to state hazard mitigation programming. These are considered to originate principally with Sections 404, 409 and 322 the Robert T. Stafford Disaster Relief and Emergency Assistance Act, which was recently amended by passage of the Disaster Mitigation Act of 2000. In addition, Section 553 of the National Flood Insurance Reform Act have also influenced the content and intentions of the strategy.

The amended Stafford Act sets in place three fundamental policies that are considered highly influential to the Kansas Hazard Mitigation Strategy. These are the following:

- Sections 404 and 409, as originally formulated, require the State to prepare and adopt both an administrative and technical plan for state-level programming in hazard mitigation in order to receive Federal funding for mitigation initiatives under the Hazard Mitigation Grant Program. Generally, such plans are to describe the natural hazards threatening a state, promulgate goals, objectives and strategies to eliminate

Tornado impact
The Wichita Eagle

or minimize vulnerabilities to those hazards, and to provide a management and administrative structure for achieving those goals, objectives and strategies,

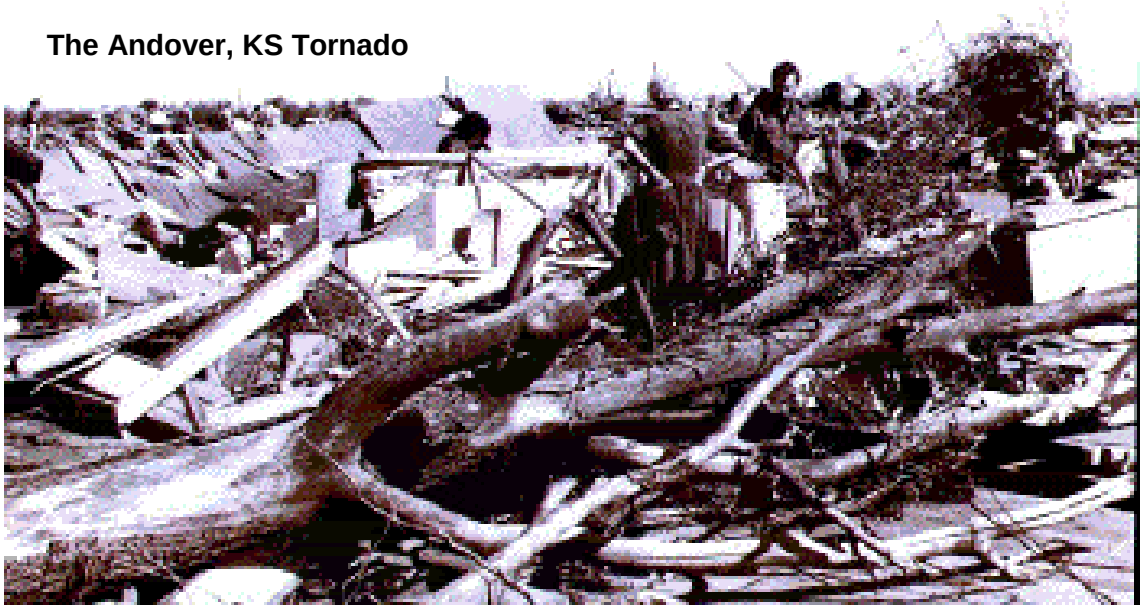
- Section 404, amended by section 204 of the Disaster Mitigation Act of 2000, allows for states to directly manage the Hazard Mitigation Grant Program, upon application to the President to do so, and upon showing that the state has the ability to manage the program, has an approved mitigation plan pursuant to Section 322 of the Act, and has a demonstrated commitment to mitigation activities.
- Section 322 of the amended Stafford Act enables states to receive an increased Federal share for mitigation activities when the state mitigation plan identifies the hazards threatening the state, supports development of local mitigation plans, provides for technical assistance to local and tribal governments for mitigation planning, and identifies and prioritizes mitigation actions that the state will support, as resources become available.

The Kansas Hazard Mitigation Strategy, as promulgated herein, is designed to achieve these requirements and derive the benefits to the State of Kansas therefore allowed.

Section 553 of the National Flood Insurance Reform Act, which is entitled “Mitigation Assistance Program,” requires a state flood risk mitigation plan to be prepared and approved by FEMA, that describes the flood mitigation activities to be carried out with the financial assistance made available through the Act. Further, Section 553 states that the flood risk mitigation plan is to be consistent with a comprehensive strategy for mitigation activities for the area affected and that has been adopted by the state. Again, the Kansas Hazard Mitigation Strategy is intended to fulfill these requirements.

In order to implement the applicable terms of the Stafford Act, the Mitigation Directorate of FEMA has promulgated policies and guidelines for preparation and review of state mitigation plans,[5] and the Kansas Hazard Mitigation Strategy has been designed to be consistent with this guidance.

The Andover, KS Tornado



3.1.2 *Current State Policy Framework*

In addition to applicable Federal policies, the State of Kansas and its agencies have developed a state-level policy framework for mitigation programming. This policy framework can be considered to be composed of state statutes addressing hazard mitigation issues, as well as general policies promulgated by the KHMT to further define the framework for mitigation programming. These are described below:

State Statutes

The State of Kansas has, over the years, promulgated a number of statutes that, supported by corresponding agency regulations and implementation programs, have shaped the current state policy framework for the Kansas Hazard Mitigation Strategy. As noted in Section 1.3, above, it is the intent of the strategy to be consistent with and supportive of these requirements. More detailed information on these state requirements is given in Appendix Three to this section of the strategy. The statutes listed in Appendix Three are considered to provide the current state policy framework for the Kansas Hazard Mitigation Strategy. The statutes listed are those that, upon analysis, are considered to more directly address hazard mitigation programming, rather that those that are basic laws and requirements that can be used for enforcement of mitigation related codes or requirements, or are otherwise only indirectly related to hazard mitigation programming.

For purposes of development of this strategy, the KHMT has identified specific categories of natural, technological and criminal hazards of priority concern. Analysis of the information provided in Appendix Three indicates that the state policy framework identified in Appendix Three does however address, in part, a number of those priority hazards identified by the KHMT. While these constitute policy bases for guiding mitigation pro-

Floods: A Kansas hazard

gramming for these priority hazards, there are indications that shortfalls may be present in the policy coverage of mitigation programming for these hazards. The Kansas Hazard Mitigation Strategy provides opportunities to address any such shortfalls.

In comparison, the information provided in Appendix Three indicates the mitigation-related policies for a number of the priority hazards identified by the KHMT.

Winter Storm/Hail	Extreme Temperatures	Earthquakes
Landslides	Subsidence	Wildfire
Terrorism		

Mitigation initiatives that can address shortfalls in policy can be considered by the KHMT for development and implementation through the strategy as it continues to be expanded in future years.

KHMT Policies

To date, beyond those decisions made for development of this strategy, the KHMT has not formulated an actual policy framework for implementation of mitigation programming in the state. The KHMT has, however, adopted a priority for the utilization of Federal funds available under the HMGP and FMAP programs. This policy is that property purchase and removal from the flood plain for flood mitigation would be the priority. The KHMT. Promulgation, implementation and maintenance of the Kansas Hazard Mitigation Strategy offer the opportunity for the KHMT to expand that policy framework. Policies incorporated into this initial edition of the strategy are as follows:

1. The authorities, capabilities, and expertise necessary for implementation of

Andover Tornado seen from McConnel AFB

the Kansas Hazard Mitigation Strategy will be derived solely from the authorities, capabilities and expertise of the participating state agencies and organizations, as evidenced by the approval of the strategy by the participating agencies, with the KHMT providing solely coordination and planning support,

2. Mitigation programming and strategy development will be based on the risk that the designated hazards pose to the state and its communities. The measure of the risk is established through the strategy by the priorities assigned by the KHMT to the designated natural, technological and criminal hazards addressed by the strategy,
3. The Kansas Hazard Mitigation Strategy will provide a bridge between Federal mitigation planning and programming and that conducted by or for local governments in the state. Development and implementation of local mitigation plans or strategies that are consistent with the national and state strategies will be encouraged and supported, and
4. The planning and coordination provided by the KHMT will be based on a management process using measurable work products and implementation schedules to ensure an ongoing capability to monitor the effectiveness of strategy implementation and recommend corrective actions to the implementing agency accordingly.

Photo: Oklahoma City, Oklahoma
Terrorism is a hazard for any state

Individual State Agency Policies

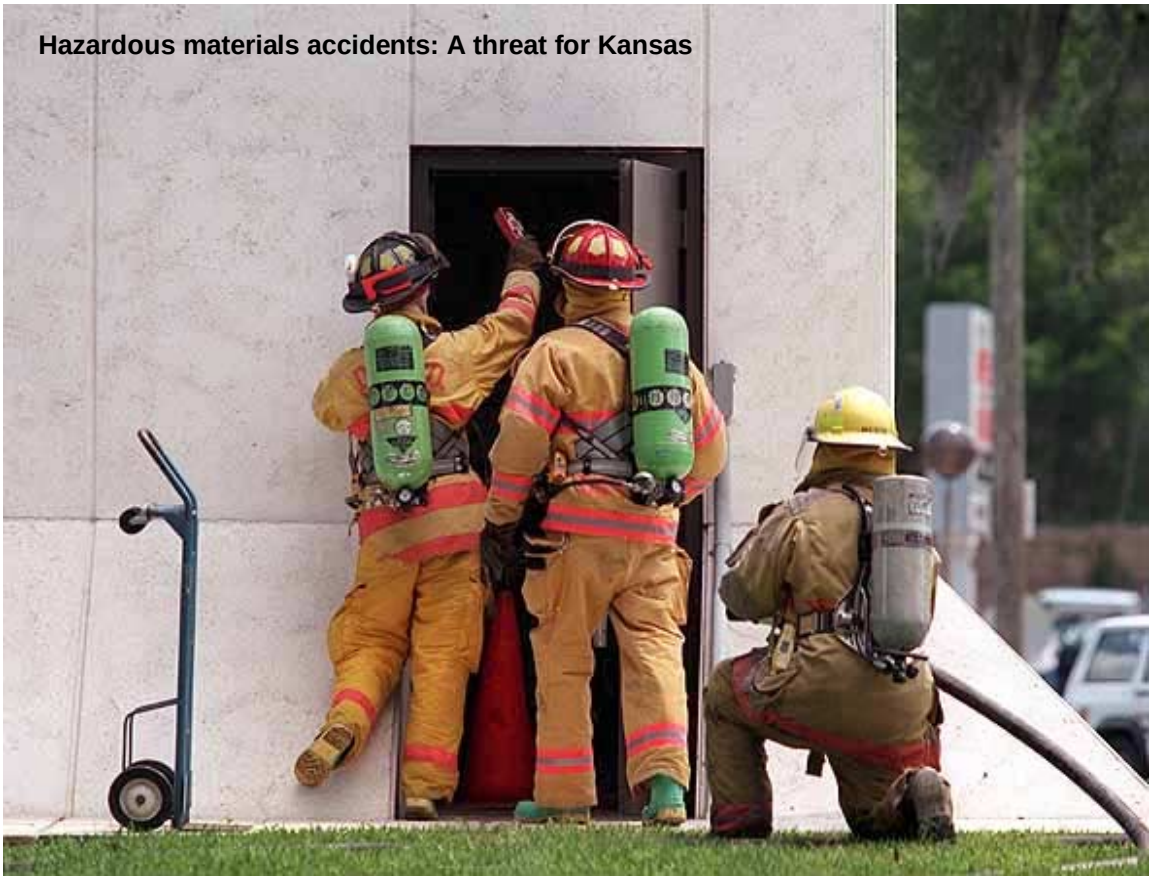
As noted in the KHMT's policies, the Kansas Hazard Mitigation Strategy recognizes that individual participating state agencies and organizations have established policies and priorities to guide their program development and implementation activities. The strategy incorporates these, without reference, into the mitigation activities identified herein for implementation, assuming that the agencies have and/or will incorporate such policies into their implementation of the agreed upon mitigation tasks.

Local Mitigation Policies

The Kansas Hazard Mitigation Strategy itself does not mandate mitigation-related policies for use by local governments in the state, with the exception that the strategy will encourage comprehensive, all hazard mitigation plan development at the community level. Rather, the strategy and its implementation tasks will affect local mitigation policies through the individual state agency program, regulation, policy or statute that may be the result of implementation of specific tasks defined in the strategy state for agency action.

Section 4.0: *Concept of Operations*

Implementation of the Kansas Hazard Mitigation Strategy relies upon the authorities, ca-



Hazardous materials accidents: A threat for Kansas

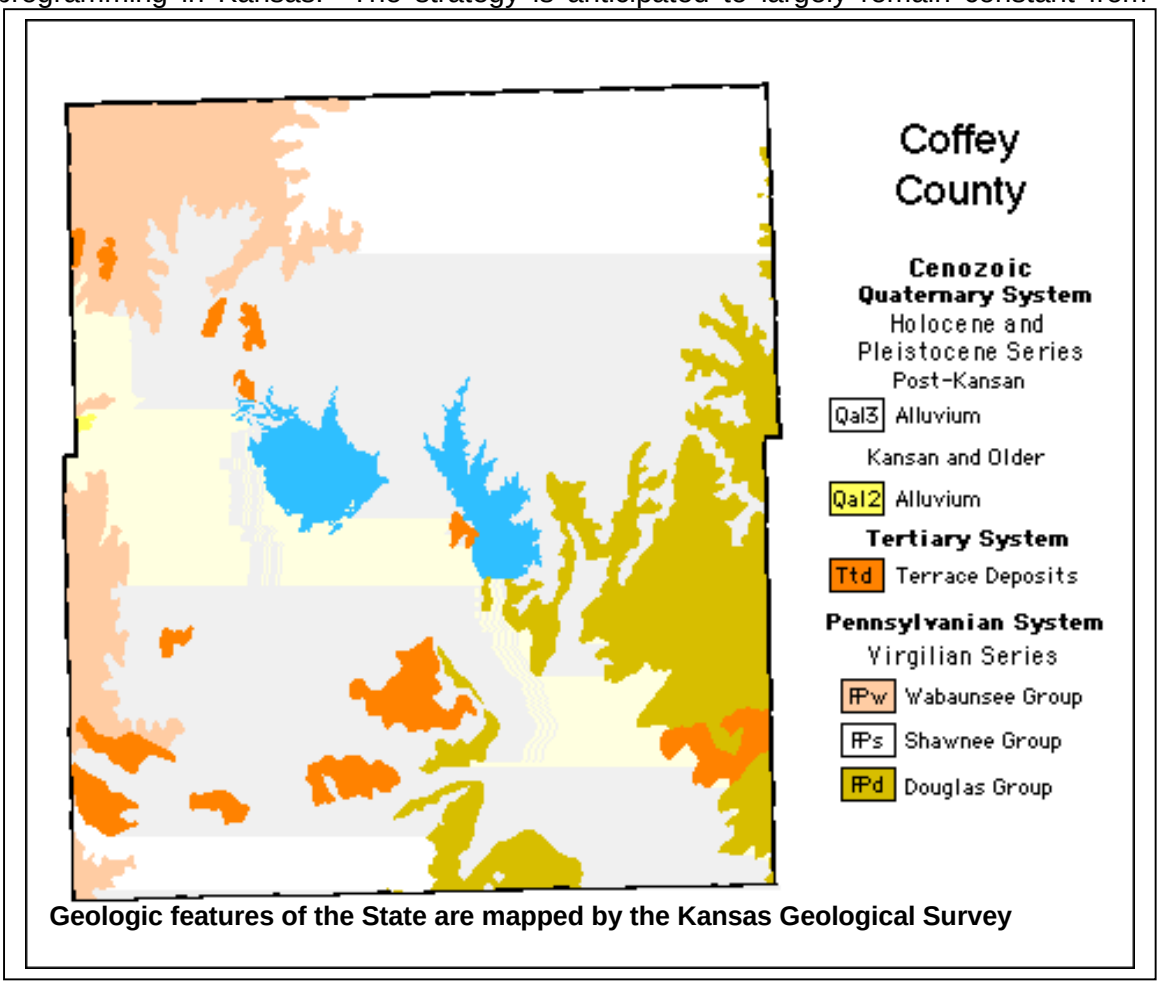
pabilities and programs of the participating state agencies and statewide organizations,

functioning through the coordination and support provided by the KHMT. The organizational structure of the KHMT, coupled with the capabilities of its participating agencies and the policies for strategy implementation, discussed in Sections 1.0, 2.0 and 3.0 respectively above, form the basis for the concept of operations for the KHMT which is described in this section.

4.1 Components of the Kansas Hazard Mitigation Strategy

The Kansas Hazard Mitigation Strategy will consist of three components: The strategy document itself, a review and assessment of the natural, technological and criminal hazards threatening the communities of the state, and a detailed strategy implementation plan. Each of these three components will be subject to periodic review by the KHMT and modification and updating as needed.

The strategy document defines the organizational structure of the KHMT, its policies and method of operation, and the basic state-level vision and goals for hazard mitigation programming in Kansas. The strategy is anticipated to largely remain constant from



Geologic features of the State are mapped by the Kansas Geological Survey

year to year, pending fundamental changes in the statutory or policy basis for its existence.

The description of the hazards is included in order to provide a mechanism for evaluation of the vulnerability of Kansas to such hazards and to identify mitigation initiatives

that are considered acceptable to the KHMT for eliminating or minimizing those vulnerabilities. This component of the strategy also provides the basic information needed for the KHMT to prioritize the hazards based on the risk they pose to the communities of Kansas in order to allocate limited resources to addressing the priority mitigation needs.

The annual management plan is a detailed task management program for making assignments to participating agencies of the KHMT for implementation of the Kansas Hazard Mitigation Strategy. The assignments may be for either separate, "one time" implementation tasks, or for phased tasks for more complex implementation projects. Each task is assigned to a lead agency that accepts responsibility for its implementation. The lead agency may solicit assistance from a designated support agency and data, information or expertise from a cooperating agency or organization. An implementation schedule is also defined for each task, as are an interim and final work product. Tasks as also assigned to a KHMT Committee that is responsible for monitoring progress on the task, and assuring that the define work product(s) are completed.

The implementation tasks defined within the work plan are also categorized within an "implementation strategy" that is used by the KHMT to track similar tasks, regardless of the lead agency to which they are assigned or the committee monitoring their progress.

Additional discussion regarding the annual management plan, its formulation, implementation and monitoring is provided in that section of the strategy.

4.2 Annual Planning Cycle

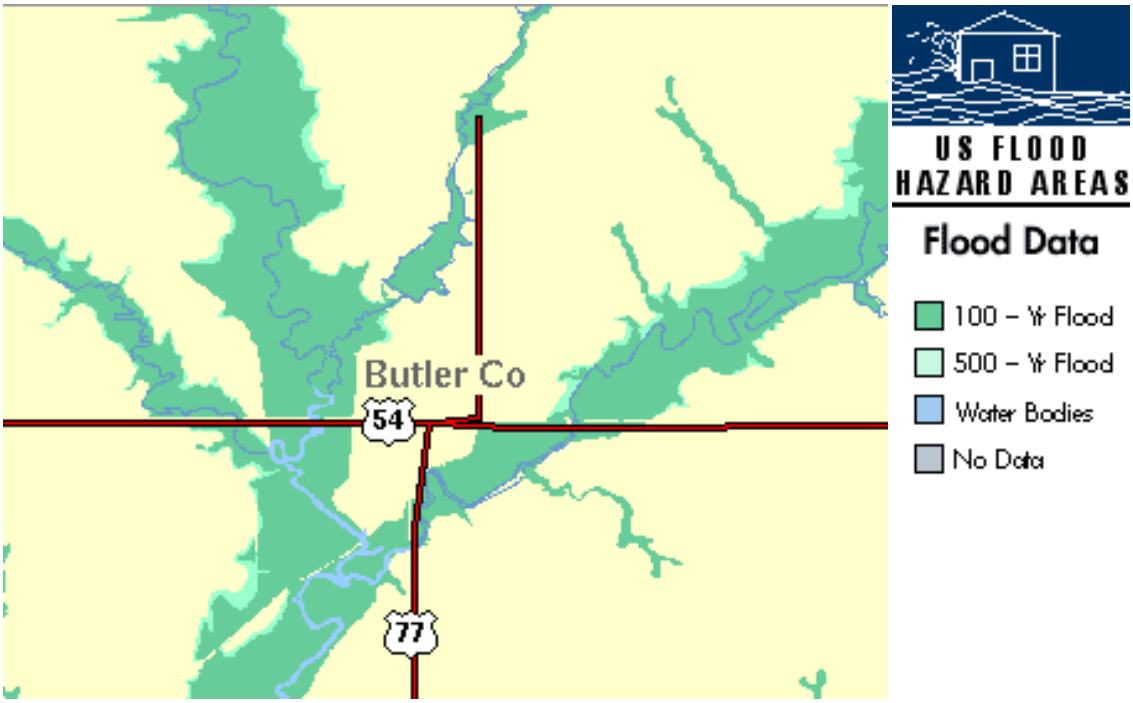
Drought and wildfire are a combined threat throughout Kanasas

The activities of the KHMT will be planned and scheduled based on an annual cycle of plan implementation, monitoring of activities, and updating of the Kansas Hazard Mitigation Strategy. Management operations such as staffing of committees, review of the progress of implementation, updating of the KHMT's task management system and production of plans and reports will be conducted in accord with this schedule. Requests or recommendations made by the KHMT as a part of this strategy, such as schedules for implementation of a local mitigation plan development process will be in accord with this annual planning cycle.

The KHMT's annual planning cycle will be from July 1 to June 30 of each year to coincide with the State's fiscal year.

In establishing an annual planning cycle, the strategy recognizes that many mitigation related project and programs will require more than a year to complete. The strategy has incorporated, therefore, the use of a three-year planning horizon, wherein the implementation tasks may be phased over this period, or longer if necessary. Each year, the three-year management plan for strategy implementation will be updated and approved by the Steering Committee.

For the initial phase of any long-term mitigation activity, the first year assignment by the KHMT annual management plan is considered to be a commitment by the designated lead agency when incorporated into the strategy, subject to the subsequent progress on that specific activity. Tasks scheduled for implementation in any later phase are considered only preliminary assignments, based on the outcome and progress of the preceding phase.



Areas throughout Kansas are vulnerable to floods

4.3 Staffing of the KHMT Committees

Each year, the staffing of all KHMT committees will be reviewed by the Steering Committee, and, as indicated, modifications, expansions or deletions from the membership will be made.

Each of the designated core members of the KHMT, as specified in the organization's charter, is entitled to a single representative on the Steering Committee, provided the core agency is a signatory to the current edition of the strategy. As also specified in the charter, the Chair of the Steering Committee is elected annually by vote of the core agencies representatives on the committee, and concurrently serves as the chair of the KHMT. The Chair of the Steering Committee appoints a Vice Chair to serve in his or her absence. Only designated representatives of the core agencies will be entitled to vote when consensus of the Steering Committee cannot be reached on an issue or decision.

Representatives of the supporting agencies, and Federal partners when present, may fully participate in all discussions of the Steering Committee and be represented in all consensus-based decisions.

The Chair of the Planning, Training, Grants Management and Codes and Regulations Committees of the KHMT will be appointed by the Chair of the Steering Committee. The Steering Committee Chair may also assign additional representatives of KHMT participating agencies and organizations to these committees. In turn, the chair of each of these committees is responsible for selecting additional members, as needed. At the discretion of the chair of a committee, membership on these committees may include any state agency, organization, association, or individual officials, if it suits the purposes

The Andover KS Tornado

of the committee.

Membership of any ad hoc, temporary committee will be appointed by the chair of the corresponding committee when necessary. Staffing of ad hoc, temporary committees is not limited, with the exception that a representative of at least one of the designated core or support state agencies will be a member. Ad hoc, temporary committees are established and dissolved at the discretion of the chair of the corresponding committee.

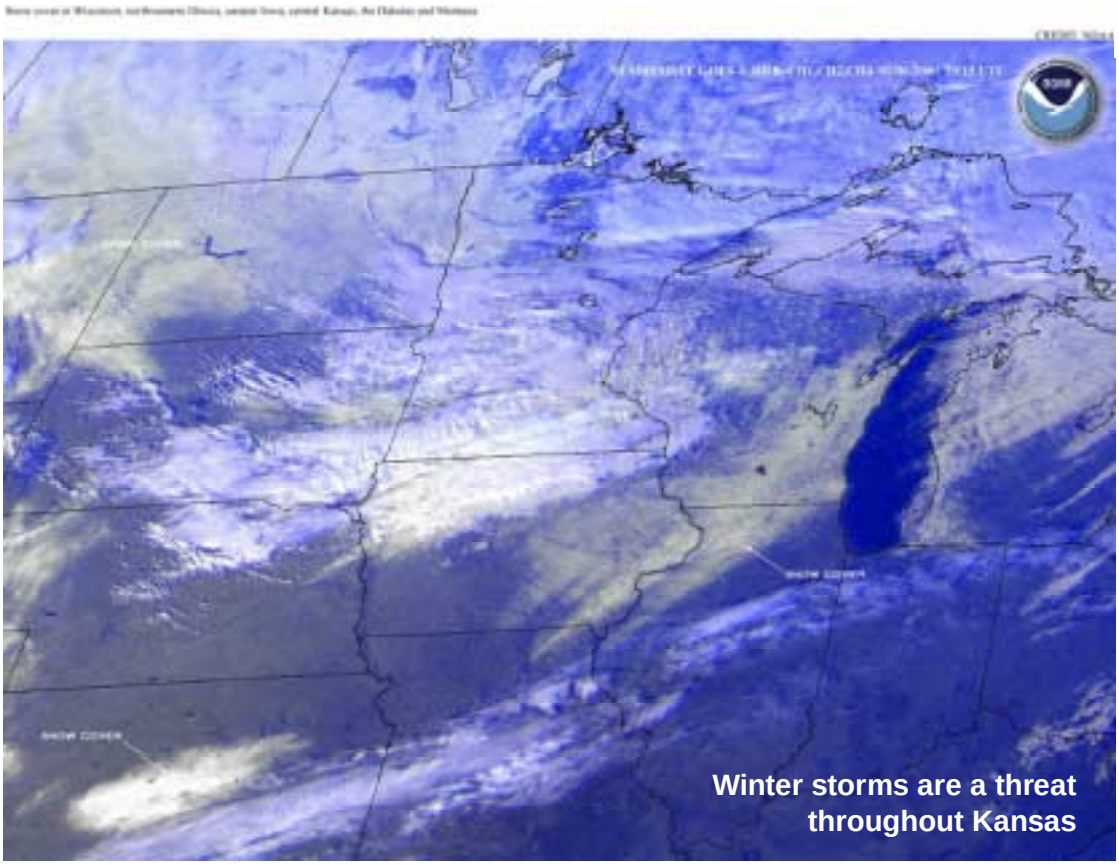
4.4 Meetings of the KHMT Committees

This section describes the meeting frequency and general topic(s) anticipated to be addressed by the applicable KHMT committee, subject to the discretion of its chair.

4.4.1 *Steering Committee*

The Steering Committee will meet at least quarterly, and at each meeting receive reports from the KHMT Planning, Codes and Regulations, Training, and Grant Management Committees. As noted in Section 2.1 above, KDEM personnel serve as support staff to the Steering Committee.

The initial Steering Committee meeting each year during the planning year will include election of a chair and appointment of a vice chair. It will also include review and modifi-



Winter storms are a threat throughout Kansas

cation of committee membership, confirmation of authorization of the current edition of

the strategy by each participating KHMT agency and organization, and review and modification, if needed, of any implementation assignments made in the current edition of the three year management plan. The Steering Committee will also review progress made on all strategy implementation tasks occurring during the preceding quarter. This meeting will also include approval of the KHMT's annual report, which will be issued to interested organizations and individuals by the KDEM, in their staff role to the KHMT upon such authorization.

The second quarterly meeting of the Steering Committee will generally focus on assessing the progress of implementation tasks occurring during the proceeding quarter and, if needed, taking corrective actions. In addition, the meeting can be used for planning for any presentations or consultations likely to be needed to maintain liaison with the Kansas Emergency Preparedness and Response Commission or other external organizations.

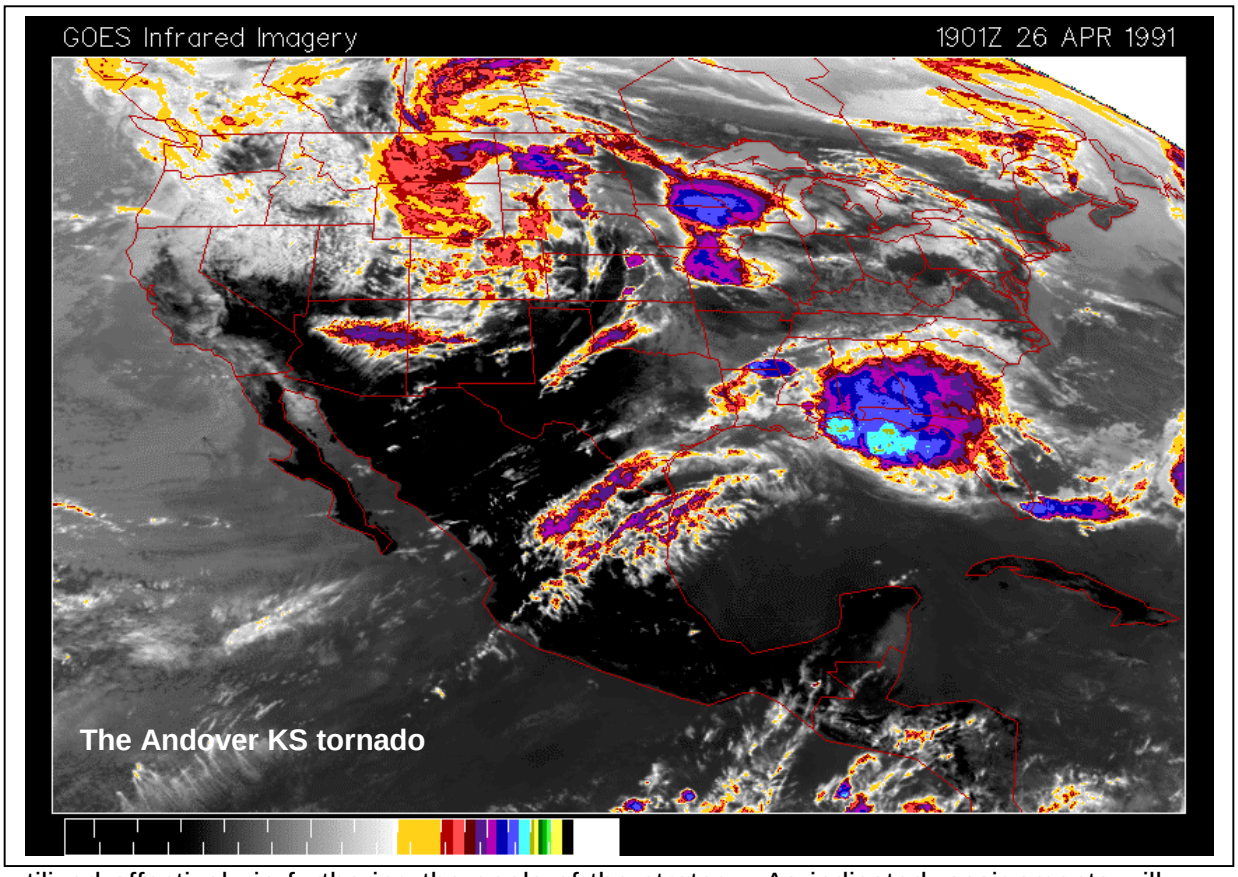
The third quarterly meeting is to examine progress made on implementation assignments during the preceding quarter, and the review of assignments to be made during the next annual planning cycle. The Steering Committee will also review the current strategy to determine if modifications or updates are needed, and if so, will direct the KDEM to make these changes. Reports from other KHMT Committees may also indicate a need to update the section of the strategy prioritizing the hazards threatening the state. During this meeting, the Steering Committee will also review any additional input received and consider it in the formulation of the management plan for the ensuing year's update of the strategy. The Steering Committee will provide recommendations and guidance to KDEM for modifications to the three-year implementation management plan at this meeting. Following the meeting, KDEM will update the strategy, hazard description and management plan in accord with this guidance, and circulate a draft update

Kansas tornado damage

of the strategy and management plan as soon as feasible thereafter. At this time, KDEM will also prepare an KHMT draft annual report summarizing the activities conducted during the year to implement the management plan and to further the mitigation capabilities of the communities of Kansas.

The fourth quarterly meeting is to review and revise the draft update of the strategy and to provide for its submission for approval to the Kansas Emergency Preparedness and Response Commission and the designated lead agencies and organizations. Modifications would be made in accord with the Steering Committee's review by KDEM, who would then distribute the final strategy and management plan for approval and implementation. During this meeting, the Steering Committee would also finalize the KHMT annual report and authorize KDEM to modify the document and distribute it to the public.

In addition to these quarterly meetings, the Steering Committee will convene after each major disaster or emergency event in the state, as soon as feasible after the termination of state emergency operations. The purpose of such a meeting will be to review the mitigation "lessons learned" from the event, to determine if priorities established for the strategy require modification, or if additional implementation tasks should be added to the management plan. The Steering Committee would also use this meeting to ensure that any Federal mitigation grant moneys that may be available due to the event will be



utilized effectively in furthering the goals of the strategy. As indicated, assignments will be made to KHMT committees or participating agencies for implementation of the findings from the review of the event. If so, KDEM would modify the management plan accordingly.

Further, if indicated, a meeting of the Steering Committee may be convened at any time upon a call from the Chair to do so.

4.4.2 *Planning Committee*

The Planning Committee is expected to meet at least bimonthly, with the support of the KDEM staff. During each meeting, the Committee will request reports from each lead agency regarding progress on the implementation tasks assigned to them that are intended to be under the coordination of this group. As indicated, KDEM staff will ensure that the annual management plan is updated accordingly.

The Planning Committee will also routinely receive reports from participating agencies and organizations regarding the status of hazard identification and vulnerability assessment issues, and the need for modification or expansion of the annual management plan to address these issues.

Mitigation must occur on the community and neighborhood level

Beginning in January of each year, the Planning Committee will also compile its findings regarding the progress in completing the implementation tasks specified in the management plan in anticipation of formulating a new, proposed management plan for the ensuring year. In doing so, the Planning Committee will consider the findings of new information regarding analysis of hazards threatening Kansas, as well as the mitigation "lessons learned" from any recent events.

No later than the 45 days prior to the third quarterly meeting of the Steering Committee, the Planning Committee will provide all recommendations for updating and modifying the management plan to KDEM in order to allow for preparation of the next proposed update of the Kansas Hazard Mitigation Strategy.

4.4.3 *Training Committee*

The Training Committee is expected to meet at least quarterly, with the support of the KDEM staff. During each meeting, the Committee will request reports from each lead agency regarding progress on the implementation tasks assigned to them that are intended to be under the coordination of this group. As indicated, KDEM staff will ensure that the annual management plan is updated accordingly.

In addition, at each meeting of the Training Committee, the group will assess new or recently modified training programs related to hazard mitigation that are available for implement in Kansas and, if indicated, determine mechanisms to incorporate their delivery

Subsidence damage requires reconstruction of a railroad **(See page 1-9)**

into the annual management plan. This committee will also review, on at least an annual basis, the continued technical and cost effectiveness of mitigation-related training being conducted in the state. If corrective actions from this analysis are indicated, these will be incorporated into the next annual management plan, through the support of KDEM.

No later than the 45 days prior to the third quarterly meeting of the Steering Committee, the Training Committee will provide all recommendations for updating and modifying the management plan to KDEM in order to allow for preparation of the next proposed update of the Kansas Hazard Mitigation Strategy.

4.4.4 *Grants Management Committee*

The Grants Management Committee is expected to meet at least quarterly, with the support of the KDEM staff. During each meeting, the Committee will request reports from each lead agency regarding progress on the implementation tasks assigned to them that are intended to be under the coordination of this group. As indicated, KDEM staff will ensure that the annual management plan is updated accordingly.

At each meeting, the Grants Management Committee will also solicit information from participating state agencies and organizations regarding recent grant opportunities, grant applications being made, or when mitigation-related projects funding in whole or in part provide a source of matching dollars for Federal grants.

In addition, it may be necessary for the Grants Management Committee to convene at other times dictated by deadlines for submission of grant requests to state or Federal agencies. This will be done to assist the lead agency responsible for the grant program in question for coordination of the grant with other aspects of the Kansas Hazard Mitigation Strategy and agency programs. Upon request of the lead agency for a grant program, the Grants Management Committee may also advise on the merits of grant applications received or to be submitted to Federal agencies.

In its role to advise on submitted state and Federal mitigation-related grant applications, the Grants Management Committee will identify the likely environmental review and permitting requirements to be placed on the project, if any. As indicated, the Grants Management Committee will advise the applicable lead state agency of these requirements and facilitate the involvement of the state agencies with environmental review or permitting authority.

4.4.5 *Codes and Regulations Committee*

The Codes and Regulations Committee is expected to meet at least quarterly, with the support of the KDEM staff. During each meeting, the Committee will request reports from each lead agency regarding progress on the implementation tasks assigned to them that are intended to be under the coordination of this group. As indicated, KDEM staff will ensure that the annual management plan is updated accordingly.

This committee may also be convened whenever necessary to respond to requests from participating state agencies or the Kansas State Legislature regarding formulation of new or updated mitigation-related codes or regulations. KHMT's participating agencies will also routinely advise this committee prior to promulgation of new or modified mitiga-

tion-related codes or regulations to ensure coordination with the Kansas Hazard Mitigation Strategy. Upon such notification, the Codes and Regulations Committee will offer, if appropriate, recommendations concerning the proposal, which the agency may then consider for, use in further developing the proposed code or regulation.

4.5 State Management of Mitigation Planning and Programming

This strategy has been developed with the intent that its implementation and continued maintenance are the sole purview of the KHMT and it's participating agencies and organizations. As allowed by Federal law, the State of Kansas, through the KHMT, intends to request and obtain authorization to administer and manage relevant hazard mitigation programs, including the HMGP pursuant to the provisions of Section 404 of the Stafford Act, as amended by Section 204 of the Disaster Mitigation Act of 2000. Achievement of his operational concept will enable the KHMT to more effectively implement this strategy and to ensure interagency coordination of mitigation planning and programming. As Federal mitigation grant programs are identified as suitable for state agency management, the KHMT will seek authorization to do so.

In managing the mitigation grant application process, the KHMT and its participating agencies will provide an established mechanism for interagency permitting and environmental review of the applications for grant funding submitted by state agencies and local units of government, should such requirements be applicable. The interagency review process, conducted through the Grants Management Committee, provides for early identification of such requirements and definition of the implications of those requirements to the success of the application and subsequent project implementation.

4.6 Management of Local Mitigation Planning

An important part of the concept of operations of the Kansas Hazard Mitigation Strategy

is to foster the development and implementation of comprehensive hazard mitigation plans at the community level. The KHMT will serve as the state coordinating body for programs, policies and technical support that are necessary to implement his concept. Accordingly, specific actions to be taken by lead agencies given in each annual management plan. Overall, however, the KHMT's role in the management of local mitigation planning will be guided by the following operational concepts to be developed and/or implemented by the KHMT and its participating agencies:

- Determining the local jurisdictions and/or organizations required to prepare, submit and adopt local mitigation plans
- Establishing and/or issuing recommended mitigation planning criteria and a technical planning approach for implementation at the local level,
- Providing education materials and/or training for local planning organizations in the development of local mitigation plans,
- Establishing acceptable technical protocols and techniques for the identification of hazards, definition of vulnerabilities, and estimation of risk that can be applied statewide in the development of local mitigation plans,
- Defining categories of critical facilities and systems that are to be addressed in local mitigation plans,
- Establishing a program to provide for technical support to local mitigation planning efforts,
- Defining a schedule for initiating and completing local mitigation plans,
- Establishing a procedure for KHMT receipt and review of completed local plans, for providing recommendations for corrections to the submitting jurisdiction, and for approving the plan,
- Establishing a procedure for interagency distribution of the completed local

mitigation plans, for assessing the potential environmental impacts of implementation of those plans, and for addressing any state and federal permitting issues that may arise, and

- Implementing a process of monitoring implementation of local mitigation plans and obtaining corrective actions by local governments as needed.

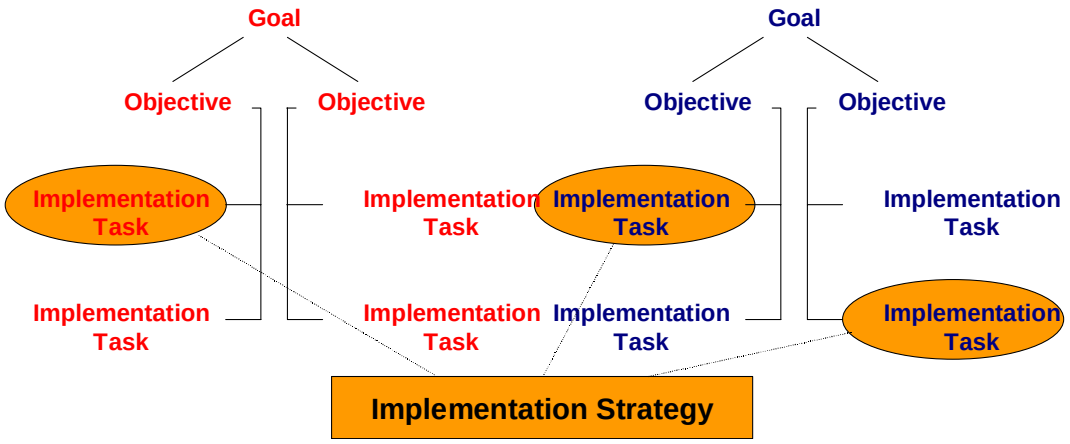
Section 5.0: *Goals for the Kansas Hazard Mitigation Strategy*

The KHMT has developed hazard mitigation programming goals for the Kansas Hazard Mitigation Strategy for its development, implementation and maintenance. These goals offer long-term guidance and form a management foundation for the KHMT to develop short-term management objectives, implementation tasks, and implementation strategies, which are used to guide development of the annual management plan. The relationship between the established goals for the strategy and the objectives, implementation assignments and implementation strategies is illustrated in this diagram.

As this diagram indicates, the KHMT establishes long-term goals for the Kansas Hazard Mitigation Strategy to shape the overall direction and desired outcome of the complete and final implementation of the strategy. Five goals have now been established by the KHMT for the Kansas Hazard Mitigation Strategy, and these are described in this section.

As the KHMT develops its annual management plan, one or more shorter-term objectives are formulated for each goal. When each of these objectives is achieved, the KHMT will have made significant progress towards the specified goal. In order to

Illustration of the Relationship of Goals, Objectives, Implementation Tasks and Implementation Strategies for the Kansas Hazard Mitigation Strategy



achieve each objective, the KHMT has incorporated into its annual management plan one or more implementation tasks that have been assigned as the responsibility of a designated lead agency. Completion of each task will also make significant progress towards achievement of the specified objective. Each implementation task is a specific assignment with an identified, measurable work product, a budget and a schedule for

completion. This allows the KHMT to carefully manage and monitor the implementation of the Kansas Hazard Mitigation Strategy.

While each specific implementation tasks is the responsibility of the designated lead agency, several tasks, under different objectives and goals, are focused on common, mitigation-related themes. A limited number of these common themes, herein called "implementation strategies," are capable of encompassing all of the numerous implementation tasks. The themes are established annually by the KHMT for purposes of allocating responsibility for monitoring the various implementation tasks to the Steering, Planning, Training, Codes and Regulations, and Grants Management Committees. Each of the KHMT committees is charged with monitoring the implementation tasks categorized into the implementation strategies for which the committee is responsible. The illustration indicates how implementation tasks for various objectives fall into specific implementation strategies.

Because they are considered shorter-term management tools, the objectives, implementation tasks, and implementation strategies are described in the annual management plan section of the strategy.

The five goals formulated by the KHMT to be achieved through full implementation of the Kansas Hazard Mitigation Strategy are the following:

- *The State of Kansas will have a policy and regulatory framework that supports effective hazard mitigation programming by state and local government.*
- *The State of Kansas will have effective mechanisms to gather, process, maintain, access and exchange the data and information necessary to support Federal, State and local hazard mitigation and other related programs.*
- *Effective training and educational opportunities in hazard mitigation and other related programs will be available for government officials, business and the public.*
- *Local governments throughout Kansas will have effective hazard mitigation policies and adequate capabilities in mitigation planning and programming.*
- *The vulnerability of the people, property and economic vitality of the communities of Kansas will be minimized through appropriate utilization of land and natural resources*

Each year, during the process to update and improve the Kansas Hazard Mitigation Strategy, the KHMT will formulate the objectives, implementation tasks and implementation strategies necessary to achieve these goals.

Appendix One

Charter of the Kansas Hazard Mitigation Team

A. Purpose: To assess hazard mitigation needs, develop and implement state-widehazard mitigation policies, promote coordination of mitigation programs at all levels of government; pursue alternate mitigation funding strategies;

B. Powers and Responsibilities: The Kansas Hazard Mitigation Team shall have the following functions, powers, and duties:

a. The development and maintenance of an effective statewide Hazard Mitigation Program, involving all levels of government encouraging government officials to continually strive to promote Hazard Mitigation, and develop disaster cost-reduction initiatives.
b. Determination of the capabilities of each State and Federal agency to address various hazards, including the legal authority of each agency and the programs and funding sources available to address mitigation activities;
c. Active participation in the development, implementation and maintenance of a Comprehensive State Hazard Mitigation Plan, with the support of the Division of Emergency Management, Adjutant General's Department;
d. Designate teams to focus on researching, developing, reviewing, specific policies or processes of various hazard mitigation aspects;
e. Coordinate all hazard reduction programs, objectives and procedures to carry out these objectives through
    i. Coordinated strategies to further common program objectives,
    ii. Identification and evaluation of common priorities for each program,
    iii. Review and make recommendations on applications for program assistance,
    iv. Coordination of mitigation activities with local and Federal government programs,
f. Propose statewide mitigation policies to the Governor, Commission on Emergency Planning and Response, and agency heads.
g. Recommend methods to improve mitigation activities of State agencies, local governments, Federal government, and private industry; and
h. Review grant applications to make funding recommendations to appropriate agencies, and
i. Seek innovative means to effect solutions to known hazards.
j. The Adjutant General's Department, Division of Emergency Management, shall provide staff support for the Kansas Hazard Mitigation Team.

C. Membership:

Core Hazard Mitigation Team will be composed of authorized representative(s) from:

i. Adjutant General's Department
ii. Kansas Department of Agriculture
iii. Kansas Department of Commerce and Housing

iv. Kansas Department of Health and Environment
v. Kansas Department of Transportation
vi. Kansas Legislative Research Department
vii. Kansas State Historical Society
viii. Kansas Water Office
ix. Kansas Wildlife and Parks

b The Kansas Hazard Mitigation Team's membership may be expanded, when additional expertise is needed for specific hazards, to include the following state, agencies:

i. Kansas Biological Survey
ii. Kansas Corporation Commission
iii. Kansas Department of Administration
iv. Kansas Department of Education
v. Kansas Department of Human Resources
vi. Kansas Department on Aging
vii. Kansas Forest Service
viii. Kansas Geological Survey
ix. Kansas Highway Patrol
x. Kansas Insurance Department
xi. Kansas State Fire Marshal's Office
xii. State Conservation Commission

c. To ensure representation of Federal partners the following agencies will be invited to participate on the team:

i. Federal Emergency Management Agency
ii. Housing and Urban Development
iii. National Weather Service
iv. U.S. Army Corps of Engineers
v. U.S. Department of Agriculture
vi. U.S. Department of Health and Human Services
vii. U.S. Department of Interior, Bureau of Reclamation
viii. U.S. Economic Development Agency
ix. U.S. Geological Survey
x. U.S. Railroad Administration
xi. U.S. Small Business Administration

d. To ensure representation of local governments the following associations will be invited to participate on the team:

i. Kansas League of Municipalities
ii. Kansas Association of Conservation Districts
iii. Kansas Association of Counties
iv. Kansas Rural Water Association
v. State Association of Kansas Watersheds

D. Chairperson: Selected annually by the Core Hazard Mitigation Team members.

E. Vice-Chairperson: Designated by the Chairperson.

F. Frequency of Meetings and Time Allotted: The Kansas Hazard Mitigation Team shall have authority to convene as necessary, and the Chairperson will be responsible for finalizing agenda issues and determining meeting times

G. Level of Empowerment: Provide advice, assistance and make recommendations, evaluation and endorsement of mitigation projects.

H. Feedback: Publish meeting summaries. Report to the Kansas Emergency Preparedness and Response Commission on a semi annual basis.

Appendix Two

Description of Current Kansas Hazard Mitigation Grant Projects

Mitigation Grants (Unmet Needs)

[Unmet Need Grants provided by PL 106-31]

DR-1254 Flooding NE & SW Kansas

Community	Status	Initial Project	Actual Project	Total Project Cost	Federal Share	Match Required	Notes
City of Shawnee	Approved	9 Properties	New	$ 1,218,568	$ 1,035,783	$ 345,261	*Offers after 01/2001*
Overland Park	DEMO	7 Properties	4	$ 402,648	$ 342,251	$ 114,084	
Leavenworth Co.	Approved	7 Properties	New	359,924	$ 305,935	$ 101,978	*Offers after 01/2001*
Lenexa	Approved	4 Properties	New	$ 620,548	$ 527,466	$ 175,822	*Offers after 01/2001*
Fairway	Approved	9 Properties	New	$ 1,782,264	$ 1,514,924	$ 504,975	*Offers after 01/2001*
Ft Scott	Approved	WWTP Protect	New	$ 1,353,000	$ 1,150,050	$ 383,350	*Design/Const.*
Leavenworth	Approved	9 Properties		$ 291,550	$ 247,818	$ 82,606	
City of Olathe	At FEMA	WWTP Protect		$ 650,002	$ 552,502	$ 184,167	*Study/Design/Const.*
Leavenworth	At FEMA	WWTP Protect		$ 2,200,000	$ 1,870,000	$ 623,333	*Design/Const*
Ks. Dept of Ag	At FEMA	Mapping		$ 271,958	$ 271,958	$ 90,653	*100% FEMA*
Subgrantees	Approved	Admin Fees (55		$ 175,313	$ 175,313	$ -	
			Total:	**$ 9,325,775**	**$ 7,993,999**	**$ 2,606,229**	

DR-1258 Flooding SC Kansas

Community	Status	Initial Project	Actual Project	Total Project Cost	Federal Share	Match Required	Notes
Butler Co.	DEMO	20 Properties	17	3,035,665	$ 2,580,315	$ 860,105	
Elmdale *	DEMO	18 Properties	4	40,000	$ 40,000	$ 13,333	
Cedar Point *	DEMO	3 Properties	1	7,800	$ 7,800	$ 2,600	
Sedgwick Co.	Approved	5 Properties	New	$ 302,880	$ 257,448	$ 85,816	*Offers being made*
Wichita	DEMO	7 Properties	4	$ 514,191	$ 437,062	$ 145,687	
Ark City	At FEMA	30 Properties		$ 594,353	$ 594,353	$ 198,118	*USACE Study*
Wichita Schools	At FEMA	Safe Rooms		$ 523,250	$ 444,763	$ 148,254	*3 total*
Neosho Co.	At FEMA	Bridge Protect		$ 384,124	$ 326,505	$ 108,835	*Design/Const*
Ks. Dept of Ag	At FEMA	Mapping		$ 685,262	$ 685,262	$ 228,421	*100% FEMA*
Subgrantees	Approved	Admin Fees (38		$ 140,491	$140,491	$ -	
* Includes 100% funding			**Total:**	**$ 6,228,016**	**$ 5,514,000**	**$ 1,791,170**	

DR-1273 Tornadoes Reno,Sedgwick, Sumner County

Community	Status	Initial Project	Actual Project	Total Project Cost	Federal Share	Match Required	Notes
Wichita	DEMO	15 Properties	7	$ 835,294	$ 710,000	$ 236,667	
RN.Co. Schools	At FEMA	Safe Rooms		$ 1,500,000	$ 1,275,000	$ 425,000	*5 total*
Wichita Schools	At FEMA	Safe Rooms		$ 2,050,213	$ 1,742,681	$ 580,894	*6 total*
Trinity	At FEMA	Safe Rooms		$ 300,000	$ 255,000	$ 85,000	*Private School. Hutch*
Holy Cross	At FEMA	Safe Rooms		$ 41,568	$ 35,333	$ 11,778	*Private School. Hutch*
Ks. Dept of Ag	At FEMA	Mapping		$ 303,387	$ 303,387	$ 101,129	*100% FEMA*
Subgrantees	Approved	Admin Fees (30		$ 104,794	$ 104,794	$ -	
			Total:	**$ 5,135,256**	**$ 4,426,195**	**$ 1,440,467**	

All Unmet Needs:	Totals:	$ 20,689,047	$ 17,934,194	$ 5,837,865

Mitigation Grants (404)

[404 Grant $ awarded for mitigation are at least 15% of the FEMA $ spent per disaster]

DR-1254 Flooding NE & SW Kansas

Community	Status	Initial Project	Actual Project	Initial Project Cost	Actual Project Cost	Federal Share	Match Required	Notes
Strong City *	Demo	27 Properties	16	$ 371,196	$ 154,550	$ 154,550	$ 51,517	100% FEMA
Cowley Co	Demo/Amend	21 Properties	5/9	$ 584,404	$ 584,404	$ 496,743	$ 165,581	Estimate
Sumner Co	Completed	5 Properties	3	$ 200,710	$ 55,430	$ 55,430	$ 18,477	
Ks. Dept of Ag	At FEMA	Mapping		$ 215,000	$ 215,000	$ 215,000	$ 71,667	
Mgmt Grant	Approved			$ 34,500	$ 34,500	$ 29,325	$ 9,775	KDEM 25%
		Total cost:		**$ 1,405,810**	**$ 1,043,884**	**$ 951,048**	**$ 317,016**	
				Total 404 Funds allocated by FEMA for DR-1254:		$ 1,006,006		
					Uncommitted:	**$ 54,958**		

* Includes 100% funding

DR-1258 Flooding SC Kansas

Community	Status	Project	Actual Project	Initial Project Cost	Actual Project Cost	Federal Share	Match Required	Notes
Augusta	Demo	43 Properties	39	$ 3,010,723	$ 2,127,605	$ 1,808,464	$ 602,821	
Ks. Dept of Ag	At FEMA	Mapping		$ 750,000	$ 750,000	$ 750,000	$ 250,000	100% FEMA
				$ 3,760,723	**$ 2,877,605**	**$ 2,558,464**	**$ 852,821**	
				Total 404 Funds allocated by FEMA for DR-1258:		$ 2,594,467		
					Uncommitted:	**$ 36,003**		

DR-1273 Tornadoes Sedgwick County

Community	Status	Project	Total Project Cost	Federal Share	Match Required	Notes
Wichita Schools	1 Built	Safe Rooms	$ 2,061,882	$ 1,752,600	$ 584,200	$ total
		Total 404 Funds allocated by FEMA for DR-1273:		$ 1,752,600		
			Uncommitted:	**$ 0**		

DR-1327 Tornadoes Crawford, Labette, Neosho Counties

Community	Status	Project	Total Project Cost	Federal Share	Match Required	Notes
Parsons	Approved	31 Properties	$ 514,534	$ 437,354	$ 145,785	Offers 01/2001
		Total 404 Funds allocated by FEMA for DR-1273:		$ 437,354		
			Uncommitted:	**$ 0**		

Total Mitigation 404 Grants

Authorized:	**$ 5,790,427**
Uncommitted:	**$ 90,961**
Match Required for ALL 404 Funds Allocated:	**$ 1,930,142**

Appendix Three

Summary of State Statutes Applicable to Hazard Mitigation Programming

Introduction and Purpose

The following is a summary of Kansas Statutes that relate to mitigation and would serve as the state's existing policy framework. This summary does not include a review of existing regulations that were subsequently drafted to implement and/or enforce the listed statutes. It also does not list all portions of statutes that may apply to a certain hazard, only the first few articles in order to indicate the intent of the statute. Excerpts appear in the order of their Chapter number.

Chapter 2. – Agriculture
Article 19. – Conservation Districts
Hazards addressed – Erosion, Water Quality, Drought

This article establishes the State Conservation Commission and five (5) statewide Conservation Districts; each with a board of supervisors responsible for overseeing conservation activities, evaluating local practices, suggesting and overseeing the implementation of mitigation measures deemed necessary, offering financial and other assistance and taking appropriate actions that would be needed to enforce any laws relating to conservation.

The following policy was established by the State Legislature:

2-1902. – Legislative determination. *It is hereby declared, as a matter of legislative determination*:

A. The condition. *That the farm and grazing lands of the state of Kansas are among the basic assets of the state and that the preservation of these lands is necessary to protect and promote the health, safety, and general welfare of its people; that improper land-use practices have caused and have contributed to, and are now causing and contributing to, a progressively more serious erosion of the farm and grazing lands of this state by wind and water; that the breaking of natural grass, plant, and forest cover have interfered with the natural factors of soil stabilization, causing loosening of soil and exhaustion of humus, and developing a soil condition that favors erosion; that the topsoil is being blown and washed out of fields and pastures; that there has been an accelerated washing of sloping fields; that these processes of erosion by wind and water speed up with removal of absorptive topsoil, causing exposure of less absorptive and less protective but more erosive subsoil; that failure by any land occupier to conserve the soil and control erosion upon said person's lands causes a washing and blowing of soil and water from said person's lands onto other lands and makes the conservation of soil, control of erosion, prevention of floods and management, control and protection of water and water quality on such other lands difficult or impossible.*

B. The consequences. *That the consequences of such soil erosion in the form of soil-blowing and soil-washing are the silting and sedimentation of stream channels, reservoirs, dams, ditches, and harbors; the loss of fertile soil material in dust storms; the piling up of soil on lower slopes, and its deposit over alluvial plains; the reduction in productivity or outright ruin of rich bottom lands by overwash of poor subsoil material, sand, and gravel swept out of the hills; deterioration of soil and its fertility, deterioration of crops grown thereon, and declining acre yields despite development of scientific processes for increasing such yields; loss of soil and water, which causes destruction of food and cover for wild life; a blowing and washing of soil into streams which silts over spawning beds, and destroys water plants, diminishing the food supply of fish; a*

diminishing of the underground water reserve, which causes water shortages, intensified periods of drought, and causes crop failures; an increase in the speed and volume of rainfall runoff, causing severe and increasing floods, which bring suffering, disease, and death; impoverishment of families attempting to farm eroding and eroded lands; damage to roads, highways, railways, farm buildings, and other property from floods and from dust storms; and losses in navigation, hydroelectric power; municipal water supply, irrigation developments, farming, and grazing.

C. The appropriate corrective methods*. That to conserve soil resources and control and prevent soil erosion and reduce flood damages and to provide for the conservation, development, utilization and disposal of water, it is necessary that land-use practices contributing to soil wastage and soil erosion be discouraged and discontinued, and appropriate soil-conserving land-use practices and structural works of improvement be adopted and carried out; that among the procedures necessary for widespread adoption, are the carrying on of engineering operations such as the construction of terraces, terrace outlets, check-dams, dikes, ponds, ditches, detention dams, grade stabilization structures, channel improvements, floodways, water resource developments and the like; the utilization of strip cropping; lister furrowing, contour cultivating, and contour furrowing; land irrigation; seeding and planting of waste, sloping, abandoned, or eroded lands to water-conserving and erosion-preventing plants, trees, and grasses; forestation and reforestation; rotation of crops; soil stabilization with trees, grasses, legumes, and other thick-growing soil-holding crops, retardation of runoff by increasing absorption of rainfall; and retirement from cultivation of steep, highly erosive areas and areas now badly gullied or otherwise eroded.*

D. Declaration of policy*. It is hereby declared to be the policy of the legislature to provide for the conservation, use and development of the soil and water resources of this state, and for the control and prevention of soil erosion, flood damages and injury to the quality of water, and thereby to preserve natural resources, control floods, prevent impairment of dams and reservoirs, assist in maintaining the navigability of rivers and harbors, preserve wild life, protect the tax base, protect public lands, and protect and promote the health, safety, and general welfare of the people of this state.*

Chapter 2. – Agriculture
Article 20. – Soil erosion caused by wind
Hazard addressed – Erosion

This articles charges individual landowners with practicing appropriate erosion preventive measures, makes it the duty of the Secretary of Agriculture to collect data, offer solutions to erosion causing conditions and report conclusions to local and state government officials and the general public and requires County Commissions to enforce erosion prevention practices as well as to take proper action to correct or mitigate potential erosion causing conditions.

2-2002. Duty of landowner*. To conserve the natural resources of the state, and to prevent the injurious effects of dust storms, it is hereby made the duty of the owner of real property in this state to prevent dust, plant or weed blowing therefrom, as nearly as that can be done, by planting of perennial grasses, shrubs, trees, annual or biennial crops, or by cultivation at such times and in such manner as will prevent or minimize erosion of the soil and dust, plant or weed blowing therefrom.*

2-2003. Data and information to be collected*. To carry out and make effective the purposes of this act it is hereby made the duty of the secretary of the state board of agriculture to collect from all available sources data and information respecting soil erosion, dust storms and plant or weed blowing and practical methods of preventing or minimizing them by planting or cultivating the soil, with particular reference to the different kinds of planting and types of cultivation most suitable to the respective types of soil in the different parts of the state taking into consideration topography and climatic conditions thereof, and most effective to accomplish the principal purposes of this act, and to transmit such data and information to the respective boards of county commissioners, members of the legislature, the governor, and make the same available to the general public.*

2-2004. Duties of county commissioners*. Further to administer, carry out and make effective the purposes of this act the board of county commissioners of each county, upon knowing or being advised that dust, any plant or weed is blowing from any particular land in the county, are hereby authorized and directed immediately to inspect such land. If it is determined the soil, any plant or weed is blowing therefrom in sufficient quantity to be injurious to the land because of erosion thereof, to nearby land because of dirt blown thereon, to nearby land because of any plant or weed blown thereon or to the public health because of dust therefrom blown into the air, they shall determine what, if anything, can be done to prevent or materially lessen the soil, any plant or weed blowing from such land, and if in their judgment that can be accomplished by prompt cultivation of the soil in some manner, they are authorized and directed to order work to be done and the time when and the type of work to be done. The board of county commissioners may order that the land be disced, listed, chiseled, cultivated, chopped or worked by any other method of control approved by the board. In all cases, where it can be done reasonably, the board of county commissioners shall confer with the owner of the land before determining or ordering work to be done thereon, and advise the owner of their conclusions and give the owner an opportunity to do the work they conclude should be done, but if the owner cannot be consulted without unreasonable delay, or cannot or will not do the work in the manner and within the time it should be done, the board of county commissioners may do the work, or employ someone to do it, and issue its warrants to pay the actual cost thereof, and pay such warrants from the fund hereinafter provided, without regard to any other statute pertaining to the issuing or paying of county warrants.*

Chapter 12. – Cities and Municipalities
Article 7. – Planning & Zoning
Hazard addressed – N/A; refers to allowance of manufactured housing

This article keeps governing bodies from enacting zoning laws that exclude manufactured housing.

12-763 **–** *Exclusion of manufactured homes prohibited, when***.** *(a) The governing body shall not adopt or enforce zoning regulations that have the effect of excluding manufactured homes from the entire zoning jurisdiction of the governing body. In addition, the governing body shall not adopt or enforce zoning regulations, which have the effect of excluding residential-design manufactured homes from single-family residential districts solely because they are manufactured homes. (b) Nothing in this section shall be construed as precluding the establishment of architectural or aesthetic standards applicable to manufactured homes so as to ensure its compatibility with site-built housing in the same zoning district. (c) Nothing in this section shall be construed to preempt or supersede valid restrictive covenants running with the land.*

Chapter 12. – Cities and Municipalities
Article 7. – Planning & Zoning
Hazard addressed – Flood

These articles give cities and municipalities the right to designate flood zones and restrict the use of land within these zones, require that any local ordinances relating to flood zones be approved by the chief engineer of the division of water resources of the state board of agriculture before adopting such ordinances and require compliance with the flood insurance act of 1968.

12-766. Flood plain zones; requirements; approval by chief engineer**.** *(a) The governing body may establish flood plain zones and districts and restrict the use of land therein and may restrict the application thereof to lands, adjacent to watercourses, subject to floods of a lesser magnitude than that having a chance occurrence in any one year of 1%. Any flood plain regulations shall comply with the minimum requirements of the national flood insurance act of 1968, as amended (42 U.S.C. §4001 et seq.) or any rules and regulations adopted pursuant thereto.*

(b) Prior to the adoption thereof, the governing body shall submit to the chief engineer of the division of water resources of the state board of agriculture any ordinance, resolution, regulation

or plan that proposes to create or to effect any change in a flood plain zone or district, or that proposes to regulate or restrict the location and use of structures, encroachments, and uses of land within such an area. The chief engineer may require, pursuant to rules and regulations, each submission hereunder to be accompanied by complete maps, plans, profiles, specifications and textual matter. The chief engineer shall approve or disapprove any such ordinance, resolution, regulation or plan or changes thereof within 90 days of the date of receipt of all such data required by the chief engineer as specified in rules and regulations adopted thereby. If the chief engineer fails to approve or disapprove within the ninety-day period required by this section, such ordinance, resolution, regulation or plan or change thereof shall be deemed approved. The chief engineer shall provide, in writing, specific reasons for any disapproval.

(c) The chief engineer shall adopt such rules and regulations deemed necessary to administer and enforce the provisions of this section.

12-767. Flood plain requirements; city building codes. *The governing body of any city located in an area designated as a flood plain shall not authorize, pursuant to its building codes, the construction, reconstruction or renovation of any building, facility or structure which does not comply with the minimum requirements of the national flood insurance act of 1968, as amended, (42 U.S.C. §4001 et seq.) or any rules and regulations adopted pursuant thereto*.

12-768. Flood plain requirements; county building codes. *The board of county commissioners of any county located in an area designated as a flood plain shall not authorize, pursuant to its building codes, the construction, reconstruction or renovation of any building, facility or structure which does not comply with the minimum requirements of the national flood insurance act of 1968, as amended, (42 U.S.C. §4001 et seq.) or any rules and regulations adopted pursuant thereto.*

Chapter 24. – Drainage and Levees
Article 12. – Watershed Districts
Hazards addressed – Erosion, Flood, Sediment damage

This article establishes the need for watershed districts and outlines how they will be established and operate.

24-1201a. - Declaration of public necessity for creation of districts; power; benefits. *It is recognized that serious problems of water management resulting from erosion, floodwater or sediment damages or instability of natural water supplies are arising in the watersheds of the rivers and streams of the state of Kansas; that for the purpose of alleviating such damages and furthering the conservation, development, utilization and disposal of water and thereby preserving and protecting the state's land and water resources, it is legislatively determined that it is necessary and advisable to establish watershed districts with the power to construct, operate and maintain works of improvement needed to carry out such purposes; that there is hereby declared the public necessity for the creation of such districts in watersheds including lands that are subject to erosion, floodwater or sediment damages or that would be benefited by the construction of works of improvement for the conservation, development, utilization and disposal of water; and that it is further declared that the formation of such districts will inure to the general benefit of all of the taxable, tangible property included therein.*

Chapter 31. – Fire Protection
Article 1. – Fire Safety and Prevention
Hazards Addressed – Fire, Tornado

This article establishes the office of the state fire marshal and outlines his duties as well as the role the state will play in fire safety and prevention. The excerpts below reflect some of the duties of the state fire marshal that might be considered mitigation activities.

31-133. - *(8) requiring administrators of public and private schools and educational institutions, except community colleges, colleges and universities, to establish tornado procedures, which procedures shall provide for at least three tornado drills to be conducted each year at some time during school hours, aside from the regular dismissal at the close of the day's session, shall describe the manner in which such tornado drills are to be conducted, and shall be subject to approval by the state fire marshal;*

(9) requiring administrators of community colleges, colleges and universities to establish tornado procedures, which procedures shall be subject to approval by the director of the disaster agency of the county;

(10) the development and implementation of a statewide system of hazardous materials assessment and response; and

(11) other safeguards, protective measures or means adapted to render inherently safe from the hazards of fire or the loss of life by fire any building or other place in which people work, live or congregate from time to time for any purpose, except buildings used wholly as dwelling houses containing no more than two families.

Chapter 48. – Militia, Defense and Public Safety
Article 9. – Emergency Preparedness for Disasters
Hazards Addressed – All

This article (known as the Kansas Emergency Management Act) creates the Division of Emergency Management under the direction of the Adjutant General and outlines the emergency management responsibilities and capabilities of the Adjutant General. It appoints the Governor as the Commander-in-Chief of the organized and unorganized militia and all other forces available for emergency duty as well as giving the Governor the power to declare a state of disaster emergency and direct emergency operations. It directs the Division of Emergency Management to formulate a statewide emergency plan and outlines the duties of the Division. It directs counties, and certain cities, to form a disaster agency and coordinate efforts with the Division. It establishes the Kansas Nuclear Safety Emergency Management Act.

48-905a. - *Division of emergency management, establishment. (a) The division of emergency preparedness within the office of the adjutant general is hereby abolished and there is hereby established within the office of the adjutant general a division of emergency management. To the extent provided in this act, all of the powers, duties and functions of such division of emergency preparedness are hereby transferred to and conferred and imposed upon the division of emergency management. The division of emergency management and the powers, duties and functions thereof shall be administered, by the adjutant general, which shall be the chief administrative officer thereof, under the supervision of the governor.*

(b) Whenever the division of emergency preparedness within the office of the adjutant general, or words of like effect, is referred to or designated by a statute, contract or other document, such reference or designation shall be deemed to apply to the division of emergency management.

(c) The division of emergency management shall be a continuation of the division of emergency preparedness within the office of the adjutant general as the same existed prior to the effective date of this act.

48-907 – *Powers and duties of adjutant general. For the purposes of administering the division of emergency management and the powers, duties and functions thereof, the adjutant general shall have the following powers and duties:*

(a) To adopt, amend and repeal rules and regulations;

(b) to cooperate with the advisory commission to the council of national defense through its division of state and local cooperation, or with any similar federal agencies hereafter created, and with any departments or other federal agencies engaged in defense or emergency management activities;

(c) to cooperate with emergency management agencies or councils and similar organizations of other states;

(d) to cooperate with county, city and interjurisdictional disaster agencies;

(e) to supervise and direct investigations, and report to the governor with recommendations for legislation or other appropriate action as the adjutant general deems necessary, with respect to any type of activity or matter of public concern or welfare insofar as the same is or may be related to emergency management;

(f) to appoint committees to aid the adjutant general in the discharge of the powers and duties conferred by this act;

(g) to require and direct the cooperation and assistance of state and local governmental agencies and officials;

(h) to serve as the chief administrative officer of the division of emergency management and the state resources administrator; and

(i) to do all acts and things, not inconsistent with law, for the furtherance of emergency management activities.

48-929. – *County and city disaster agencies; determination by governor; disaster emergency plans by county, city and interjurisdictional disaster agencies; duties of local officials. (a) Each county within this state shall establish and maintain a disaster agency responsible for emergency management and coordination of response to disasters or shall participate in an interjurisdictional arrangement for such purposes under an interjurisdictional disaster agency as provided in K.S.A. 48-930, and amendments thereto. Except as otherwise provided in this act, each county or interjurisdictional disaster agency shall have jurisdiction over and serve all of each county included thereunder. No county, which is, included in an interjurisdictional arrangement under the jurisdiction of an interjurisdictional disaster agency pursuant to subsection (a) of K.S.A. 48-930, and amendments thereto, shall establish or maintain a separate disaster agency for such county.*

(b) The governor shall determine which cities need disaster agencies of their own and, upon such determination, shall require that each such city establish and maintain a disaster agency therefor. The governor shall make such determinations on the basis of each city's disaster vulnerability and capability of response related to population size and concentration. The disaster agency of a county shall cooperate with the disaster agency of any city located within such county, but shall not have jurisdiction within a city having its own disaster agency. The division of emergency management shall publish and keep current a list of cities, which are required to have disaster agencies under this subsection.

(c) The mayor or other principal executive officer of each city required to have a disaster agency and the chairperson of the board of county commissioners of each county shall notify the division of emergency management of the manner in which such city or county is providing or securing disaster planning and emergency services, identify the person who heads the agency responsible for providing such services and furnish additional information relating thereto as the division of emergency management requires.

(d) In accordance with the standards and requirements for disaster emergency plans promulgated by the division of emergency management, each county, city and interjurisdictional disaster agency shall prepare and keep current a disaster emergency plan for the area under its jurisdiction, which has been approved after examination and periodic review by the division of emergency management.

(e) The county, city or interjurisdictional disaster agency, as the case may be, shall prepare and distribute to all appropriate officials in written form a clear and complete statement of the emergency responsibilities of all local agencies and officials and of the disaster chain of command.

(f) Any county and any city which is required to establish a disaster agency under this section, may designate the local council of defense, which was established in accordance with K.S.A. 48-909, and amendments thereto, for such county or city and which was in existence on the day immediately preceding the effective date of this act, as such county or city disaster agency under this section.

(g) When the corporate limits of any city extend into two counties, and the city has not been required to establish a disaster agency in accordance with this section and an interjurisdictional agency including such counties has not been established pursuant to K.S.A. 48-930, and amendments thereto, the governing body of such city may petition the board of county commissioners of the two counties to enter into an agreement which designates one of the counties as the disaster agency for such city for the purposes specified in this act. The board of county commissioners of the two counties shall consult and meet with the governing body of the affected city prior to such agreement being approved. If an agreement has not been entered into within one year after the city's petition, the city or either of the counties may petition and the adjutant general shall designate one of the counties as the disaster agency for the city. The adjutant general's designation shall be final and binding on the city and counties until such designation is revised by the adjutant general or by agreement of the two counties in accordance with the procedures in this section. Any agreement entered into in accordance with this section shall meet the requirements of K.S.A. 12-2901 et seq., and amendments thereto, the interlocal cooperation act.

Chapter 55 – Oil and Gas

This chapter has numerous statutes that address how oil and gas may be produced, transported, sold and disposed of as well as regulations regarding by products of oil and gas wells. No statutes are shown here, as the list would be too extensive for the purposes of this review. This Chapter addresses all state requirements for oil and gas operators but would seem to address the hazardous materials and water quality hazards identified by the KHMT.

Chapter 65 – Public Health
Article 33 – Water Pollution Control
Hazard addressed – Water Quality

This article identifies the need to prevent water pollution, sets up the treasury account for local assistance and allows for the establishment of wastewater management districts.

65-3301. – *Statement of purpose. Because the pollution of waters constitutes a menace to public health, creates public nuisances, is harmful to wildlife, fish and aquatic life, and impairs domestic, agricultural, industrial, recreational and other legitimate beneficial uses of water; and since federal legislation provides incentives for state financial participation in the construction of public water pollution control facilities by increasing the portion of federal aid contributed when the state also participates; the legislature hereby determines that it is essential for the public health, safety and welfare of the state and the residents thereof and advantageous to state and local government taxpayers to undertake a program to financially assist the construction of public facilities to abate and prevent the pollution of water, such program to be undertaken as a cooperative partnership with municipalities and with the United States government and agencies thereof.*

65-3308. – *Countywide wastewater management plans; rules and regulations of secretary. The secretary of health and environment shall promulgate rules and regulations, guidelines, standards and procedures for the development of countywide wastewater management plans, and any other rules and regulations necessary for effective implementation of this act.*

65-3310. – *Duties and functions of secretary. The secretary of health and environment is authorized and directed to:*

(a) Adopt rules and regulations, standards and procedures to be used by counties in the development and the periodic updating of wastewater management plans, and to enable the secretary to carry out the purposes and provisions of this act;

(b) receive and disburse any federal funds received for development and implementation of countywide wastewater management plans;

(c) administer the wastewater management program and enforce the provisions of each county wastewater management plan adopted pursuant to the provisions of this act;

(d) provide technical assistance to counties, including the training of personnel;

(e) institute, conduct and support research, demonstration projects and investigations and coordinate all state agency research programs with applicable federal programs pertaining to wastewater management; and

(f) conduct and contract for researchers and investigations in the area of wastewater management of point source pollution.

Chapter 65 – Public Health
Article 34 – Solid and Hazardous Waste
Hazards addressed – Water Quality

65-3401. – *Statement of policy. It is hereby declared that protection of the health and welfare of the citizens of Kansas requires the safe and sanitary disposal of solid wastes. The legislature finds that the lack of adequate state regulations and control of solid waste and solid waste management systems has resulted in undesirable and inadequate solid waste management practices that are detrimental to the health of the citizens of the state; degrade the quality of the environment; and cause economic loss. For these reasons it is the policy of the state to:*

(a) Establish and maintain a cooperative state and local program of planning and technical and financial assistance for comprehensive solid waste management.

(b) Utilize the capabilities of private enterprise as well as the services of public agencies to accomplish the desired objectives of an effective solid waste management program.

(c) Require a permit for the operation of solid waste processing and disposal systems.

(d) Achieve and maintain status for the Kansas department of health and environment as an approved state agency for the purpose of administering federal municipal solid waste management laws and regulations.

(e) Encourage the wise use of resources through development of strategies that reduce, reuse and recycle materials.

Chapter 65 – Public Health
Article 57 – Emergency Planning and Community Right to Know
Hazard Addressed – Hazardous Materials

65-5701 - *Citation of act. This act shall be known and may be cited as the Kansas emergency planning and community right-to-know act.*

65-5703 - *State emergency response commission created; membership; terms; compensation and expenses; duties.*

(a) There is hereby created the state emergency response commission for the purpose of carrying out all requirements of the federal act and for the purpose of providing assistance in the coordination of state agency activities relating to: (1) Chemical emergency training, preparedness, and response; and (2) chemical release reporting and prevention, transportation, manufacture, storage, handling, and use.

(b) The commission shall consist of: (1) The following state officers or their appointed designees: The lieutenant governor, the secretary of wildlife and parks, the secretary of human resources, the secretary of the state board of agriculture, the secretary of health and environment, the adjutant general, the superintendent of the Kansas highway patrol, the state fire marshal, the secretary of transportation, the attorney general, the chairperson of the state corporation commission, and the governor; (2) three members appointed by the governor to represent the general public; and (3) two members appointed by the governor to represent owners and operators of facilities regulated pursuant to this act.

(c) Members of the commission appointed by the governor shall serve for terms of two years. Any vacancy in the office of an appointed member of the commission shall be filled for the unexpired term by appointment by the governor.

(d) A chairperson shall be elected annually by the members of the commission. A vice-chairperson shall be designated by the chairperson to serve in the absence of the chairperson.

(e) Members of the commission attending meetings of such board, or attending a subcommittee meeting thereof authorized by such board, shall be paid compensation, subsistence allowances, mileage and other expenses as provided in K.S.A. 75-3223 and amendments thereto.

(f) The commission shall perform such duties as are specified in the federal act to be performed by such commissions and, in addition thereto, such duties as are specified in the laws of this state or as are deemed necessary and appropriate by the commission to achieving its purposes. In accordance with the requirements of the federal act, the commission shall establish local planning districts, subject to approval by the secretary of health and environment and the adjutant general, and shall appoint a local planning committee for each such district. Local planning committees shall perform such duties as are specified in the federal act to be performed by such committees, and in addition thereto, such duties as are assigned by the commission or by any member of the commission acting on behalf of or at the direction of the commission, or as are deemed necessary and appropriate by each such committee to achieving its purposes. The duties of the commission and the local planning committees shall be performed in accordance with rules and regulations adopted pursuant to this act.

Chapter 66 – Public Utilities
Article 18 – Utility Damage Prevention
Hazard Addressed – Infrastructure Failure

66-1801 – Kansas underground utility damage prevention act. This act shall be known and may be cited as the Kansas underground utility damage prevention act.

66-1803 -- Excavator's duty to ascertain location of facilities. An excavator shall not engage in excavation near the location of any underground facility without first having ascertained, in the manner prescribed in this act, a location of all underground facilities in the proposed area of the excavation.

66-1804 (a) – Notice of intent to excavation. An excavator shall serve notice of intent of excavation at least two full working days, but not more than 10 working days before commencing the excavation activity, on each operator having underground facilities located in the proposed area of excavation.

66-1805(a) – Notification center. This act recognizes the value of and encourages and authorizes the establishment of a single notification center. Each operator who has an underground facility shall become a member of the notification center.

66-1806(a) -- Identification of location of facilities; duties of operator. An operator served with notice shall, in advance of the proposed excavation, unless otherwise agreed between the parties, inform the excavator of the tolerance zone of the underground facilities of the operator in the area of the planned excavation by marking, flagging or other acceptable method no sooner than two working days prior to the planned excavation.

Chapter 68 – Roads and Bridges
Article 9 – Damming of Draws, Dry Water Courses and Creeks
Hazard Addressed - Flood

68-901 - *Adoption of act by county; resolution; petition. The provisions of this act shall apply only to such counties in this state as shall, by resolution of their respective boards of county commis-*

sioners, duly adopt the same. Said resolution shall be substantially as follows: "Resolved, That this county adopt and accept the provisions of the act of the legislature of 1915, entitled an act providing for the damming of draws, dry watercourses and creeks of running water, on public highways in such counties as shall adopt the provisions of this act." Provided, That if the county commissioners on their own motion fail to adopt said resolution when a petition requesting them to do so, signed by 25 percent of the taxpayers of any county in this state is filed with the county clerk, the commissioners of such county shall adopt such resolution at their next regular meeting, after such petition has been presented, and if such petition is presented during a regular meeting of said board, it shall be their duty to pass such resolution before adjournment of such regular meeting.

68-902 - *Construction of dams on township and post roads. In all counties adopting the provisions of this act, it shall be the duty of the highway commissioners of the respective townships of said county, whenever it shall be necessary to construct a bridge or culvert across any draw, dry watercourse or creek of running water on any public highway in their township, to construct across said draw or dry watercourse, and to construct across any running creek, if in their judgment it can be successfully done, a dam to be constructed either of dirt, cement or stone, as in the judgment of the highway commissioners of such township shall be deemed most feasible. That said dam shall be so constructed, that a spillway shall be provided to carry off surplus flood waters, and in case it is not convenient to construct spillways or it is thought to be too expensive, then the top of said dam shall be made of cement or stone or out of both materials, in such proportions and at such depth as will permit the overflow water to pass over said dam without washing: And provided further, That all dams shall be at least sixteen feet wide at the top on all township and mail-route roads.*

68-904 - *Construction of dams on county and state roads. In all counties adopting the provisions of this act, it shall be the duty of the county commissioners together with the county engineer, as highway commissioners for all county and state roads, whenever it shall be decided necessary to construct a bridge or culvert across any draw, dry watercourse or creek of running water, on any public county or state highway in their county, to construct across said draw or dry watercourse, and to construct across any creek of running water, if in their judgment it can successfully be done, a dam to be constructed either of dirt, cement or stone, as in the judgment of the highway commissioners of such county shall be deemed most feasible. That said dam shall be constructed the same as provided in K.S.A. 68-902, except that dams constructed on county and state highways shall be at least twenty feet wide at the top.*

Chapter 68 – Roads and Bridges
Article 15 - Bridges and Dams Across Navigable Streams
Hazard Addressed - Flood

68-1501 - *Authority and purpose. Municipalities, corporations, persons and individuals are hereby authorized and empowered to build and construct bridges, dams (for power, irrigation and other purposes) and obstructions (for the purpose of preserving the banks from erosion) in, over and across the navigable rivers of the state, under the provisions and conditions contained in this act.*

68-1502 - *Plans and specifications; approval; floodgates. Any municipality, corporation, person or individual desiring to construct a bridge, dam or other obstruction for either public or private purposes, or to repair or maintain a bridge, dam or other obstruction already constructed, over any of the navigable rivers of the state, shall prepare plans and specifications, together with the data upon which they are based, and shall, when such bridge or dam forms part of a public highway, submit the plans, specifications and data to the secretary of transportation for the secretary's inspection and approval. When the plans and specifications are approved by the secretary, the municipality, corporation, person or individual is authorized and empowered to construct, repair and maintain said bridge or bridges, dam or dams, or other obstructions according to the plans and specifications approved by the secretary of transportation and under the direction and super-*

vision of the secretary. No plans for the construction of any such dam shall be approved, and no such dam shall be constructed unless it contains flood gates or openings that can be opened in times of high water, so as to prevent the overflow of lands in the vicinity of the dam.

68-1503 - *Approval of plans of prior projects. Any municipality, corporation, person or individual who has already constructed any bridge or bridges, dam or dams or other obstructions in, over or across any of the navigable rivers of the state, shall make application and submit the plans, specifications and construction of such bridge or bridges, dam or dams or other obstruction to the secretary of transportation when such bridge or bridges, dam or dams or other obstruction forms a part of a public highway, for the secretary's inspection and approval.*

The secretary of transportation shall act upon the application as practicable. Upon the approval of the plans, specifications and construction of the bridge or bridges, dam or dams or other obstruction, by the secretary of transportation the bridge or bridges, dam or dams or other obstruction shall immediately become established and the right to maintain the bridge or bridges, dam or dams or other obstruction in, over or across such navigable rivers, confirmed and made permanent to the same extent and effect as if such right had been originally obtained and granted as provided by the preceding section, but all rights and privileges granted by this act shall be subject to the future wants and needs of the government of the United States and of the state of Kansas.

Chapter 74 – State Boards, Commissions and Authorities
Article 26 – Kansas Water Office and Kansas Water Authority
Hazards Addressed: Drought

74-2608 - Duties of office. *The Kansas water office shall:*

(a) Collect and compile information pertaining to climate, water and soil as related to the usage of water for agricultural, industrial and municipal purposes and the availability of water supplies in the several watersheds of the state, and, in so doing, the office shall collect and compile the information obtainable from other agencies, instrumentality's of the state, political subdivisions of the state and the federal government.

(b) Develop a state plan of water resources management, conservation and development for water planning areas as determined by the office, and cooperate with any agency or instrumentality of the state or federal government now or hereafter engaged in the development of plans or having developed plans affecting any such area of the state.

(c) Develop and maintain guidelines for water conservation plans and practices. Such guidelines shall:

(1) Not prejudicially or unreasonably affect the public interest;
(2) be technologically and economically feasible for each water user to implement;
(3) be designed to curtail the waste of water;
(4) consider the use of other water if the use of freshwater is not necessary;
(5) not require curtailment in water use, which will not benefit other water users or the public interest;
(6) not result in the unreasonable deterioration of the quality of the waters of the state;
(7) consider the reasonable needs of the water user at the time;
(8) not conflict with the provisions of the Kansas water appropriation act and the state water planning act;
(9) be limited to practices of water use efficiency except for drought contingency plans for municipal users; and
(10) take into consideration drought contingency plans for municipal and industrial users.

When developing such guidelines, the Kansas water office shall consider existing guidelines of groundwater management districts and the cost to benefit ratio effect of any plan.

(d) The Kansas water office, with the approval of the Kansas water authority, shall establish guidelines as to when conditions indicative of drought exist. When the Kansas water office deter-

mines that such conditions exist in an area, it shall so advise the governor and shall recommend the assembling of the governor's drought response team.

History: *L. 1955, ch. 356, § 4; L. 1967, ch. 420, § 1; L. 1981, ch. 398, § 11; L. 1981, ch. 302, § 12; L. 1986, ch. 392, § 1; L. 1991, ch. 292, § 2; July 1.*

Chapter 82a – Waters and Watercourses
Article 2 – Navigable Waters
Hazard Addressed – Flood

This article addresses the right of the state to purchase any land that lies under a water channel where that water channel has been changed by flood or avulsion.

82a-201 - *Acquisition by state of new channel where stream altered. Whenever the channel, or any part thereof, of any navigable stream in the state of Kansas has heretofore been, or shall hereafter be, suddenly changed or altered by such stream establishing a new channel by flood or avulsion and the title to the abandoned channel is not controlled by K.S.A. 24-454, the secretary of state, as soon as practicable thereafter, shall procure the fee title in the state of Kansas to such new channel, by purchase or by condemnation proceedings.*

82a-202 - *Secretary of state to procure title; limitation on cost. In the event that the channel, or any part thereof, of any navigable stream has heretofore been, or shall hereafter be, altered or changed in the manner described in K.S.A. 82a-201, the secretary of state, as soon as practicable, shall enter into negotiations with the owner or owners of the title to such new channel for the purpose of procuring deeds conveying title in fee to the state of Kansas for such new channel between the banks thereof, at high-water mark, for such sum or sums as may be agreed upon between the owner or owners and the secretary of state. No sum shall be paid for the new channel in excess of the net amount realized from the sale of the corresponding abandoned channel.*

Chapter 82a – Waters and Watercourses
Article 3 – Obstructions in Streams
Hazards Addressed – Dam Failure, Flood

82a-301a - *Exclusive regulation and supervision of dams and other water obstructions by chief engineer. It is the intent of the legislature by this act to provide for the exclusive regulation of construction, operation and maintenance of all dams or other water obstructions by the state to the extent required for the protection of public safety. All dams or other water obstructions are declared to be under the jurisdiction of the division of water resources of the state board of agriculture and the chief engineer thereof. The chief engineer or his or her authorized representative shall supervise the construction, modification, operation and maintenance of dams or other water obstructions for the protection of life and property.*

Chapter 82a – Waters and Watercourses
Article 4 – Collection, Storage and Impounding of Waters
Hazards Addressed – Drought, Flood

82a-405 - *Construction and maintenance of dams and reservoirs; tax exemption. Any landowner owning land in the state of Kansas, not within the corporate limits in any city in this state, who shall lawfully by the construction of a dam across a dry watercourse or any stream or watercourse draining an area not exceeding ten (10) square miles, form upon his or her own land one or more reservoirs, having along the axis of the dam at the lowest point in the natural bed of a stream or watercourse a depth of not less than ten (10) feet and a storage capacity at spillway level, including the volume of any excavation in the reservoir area below such level, of not less than five (5) acre feet, for the collection and storage of surface water or flood detention storage, and who shall maintain such dam or dams in a condition satisfactory to the chief engineer of the division of wa-*

ter resources in the state board of agriculture, shall be entitled to an exemption from taxes levied upon such land in the amount prescribed by K.S.A. 79-201g.

82a-406 – Approval of plans by chief engineer; construction in accordance with plans. In order to be entitled to the tax exemption provided in K.S.A. 79-201g, the landowner must submit to the chief engineer of the division of water resources, complete plans for such dam showing the area of the drainage basin above the dam; plan, profile and cross sections of the dam and spillway; topographic map of the reservoir basin, and such other data and information as the chief engineer of the division of water resources may require, and such plans shall have the approval of the chief engineer and the dam be constructed in accordance with such plans before such exemption can be claimed.

82a-408 – *Access to reservoirs when drought emergency declared; rules and regulations. Whenever during periods of drought, it is deemed warranted in the judgment of a majority of the board of county commissioners of any county in this state, the commissioners may by resolution, duly adopted, declare a drought emergency to exist and shall determine where surplus water supplies exist and are available in reservoirs constructed in that county under the provisions of this act and may prescribe rules and regulations for obtaining such surplus waters. The owner of any land on which such a water supply has been or may be impounded, shall, upon being notified by the board of county commissioners, permit entry upon his or her land and access to the reservoir to all persons for the purpose of obtaining water in accordance with the rules and regulations prescribed by the board of county commissioners.*

Chapter 82a – Waters and Watercourses
Article 6 – Water Districts
Hazard Addressed – Water Quality

82a-602 - *Petition for organization of water-supply district. Any two or more owners of adjacent lands within any county may file with the county clerk a petition addressed to the board of county commissioners praying for the incorporation of a water-supply district. The petition shall (1) describe by section, or fraction thereof, and by township and range the location of lands owned by the petitioners and desired to be incorporated into the proposed water-supply district and shall state (2) that such lands are without an adequate water supply; (3) that the construction of dams, wells or other works are necessary to develop an adequate water supply, and (4) that such improvement or works will be conducive to and will promote the public health, convenience and welfare.*

82a-604 - *Consideration of petition by county commissioners. At the time set for the hearing and consideration of the petition as provided in the preceding section, it shall be the duty of the board of county commissioners to ascertain (1) whether proper notice of the hearing has been given to the signers of the petition and the chief engineer as required by this act; (2) whether lands described in the petition are without an adequate water supply; (3) whether the construction of dams, wells or other works are necessary to develop an adequate water supply; (4) whether such improvements or works will be conducive to and will tend to promote the public health, convenience and welfare.*

Chapter 82a – Waters and Watercourses
Article 9 – State Water Resource Planning
Hazard Addressed – Water Quality

82a-901a - *Legislative declaration. The people of the state can best achieve the proper utilization and control of the water resources of the state through comprehensive planning which coordi-*

nates and provides guidance for the management, conservation and development of the state's water resources.

82a-903 – *Formulation of state water plan; cooperation of state water agencies; advice of general public. In accordance with the policies and long-range goals and objectives established by the legislature, the office shall formulate on a continuing basis a comprehensive state water plan for the management, conservation and development of the water resources of the state. Such state water plan shall include sections corresponding with water planning areas as determined by the office. The Kansas water office and the Kansas water authority shall seek advice from the general public and from committees consisting of individuals with knowledge of and interest in water issues in the water planning areas. The plan shall set forth the recommendations of the office for the management, conservation and development of the water resources of the state, including the general location, character, and extent of such existing and proposed projects, programs, and facilities as are necessary or desirable in the judgment of the office to accomplish such policies, goals and objectives. The plan shall specify standards for operation and management of such projects, programs, and facilities as are necessary or desirable. The plan shall be formulated and used for the general purpose of accomplishing the coordinated management, conservation and development of the water resources of the state. The division of water resources of the state board of agriculture, state geological survey, the division of environment of the department of health and environment, department of wildlife and parks, state conservation commission and all other interested state agencies shall cooperate with the office in formulation of such plan.*

Chapter 82A – Waters and Watercourses
Article 9 – State Water Plan
Hazard Address – Water-related Hazards

This article defines the goals and policies of the State's Water Plan

82a-927 – *State water plan; long range goals. The long-range goals and objectives of the state of Kansas for management, conservation and development of the waters of the state are... the reduction of damaging floods and of losses resulting from floods; the protection and the improvement of the quality of the water supplies of the state...the protection of the public interest through the conservation of the water resources of the state in a technologically and economically feasible manner.*

82a – 928 – *State water plan; polices to achieve long-range goals. The policies of the state of Kansas that are deemed desirable for achievement of the long-range goals and objectives as set forth in K.S.A.82a-927, and amendments thereto, and that shall serve as guidelines for public corporations and all agencies of the state, relative to their responsibilities with respect to the water resources of the state whenever physical and economic conditions permit, are hereby declared to be: (a) the utilization of nonstructural methods, including floodplain regulation, and structural measures for the reduction of flood damage; (b) the design of the proposed levees and dikes so as to reduce flood risks in agricultural areas to a chance of occurrence in any one year of 10% or less; (c) the design of proposed levees and dikes so as to reduce flood risks in urban areas to a chance of occurrence in any one year of 1% or less; (d) the design of proposed storage structures for the protection of agricultural areas so as to provide sufficient capacity to control the volume of a flood having a chance of occurrence in any one year of 4% or less; (e) the design of proposed storage structures for the protection of urban areas to provide sufficient capacity to control the volume of a flood having a chance of occurrence in any one year of 2% or less;... (q) the design of municipal water systems to provide an adequate water supply to meet the needs during a drought having a 2% chance of occurrence.*

Chapter 82a – Waters and Watercourses
Article 10 – Groundwater Management Districts
Hazard Addressed – Water Quality

82a-1020 - Legislative declaration. *It is hereby recognized that a need exists for the creation of special districts for the proper management of the groundwater resources of the state; for the conservation of groundwater resources; for the prevention of economic deterioration; for associated endeavors within the state of Kansas through the stabilization of agriculture; and to secure for Kansas the benefit of its fertile soils and favorable location with respect to national and world markets. It is the policy of this act to preserve basic water use doctrine and to establish the right of local water users to determine their destiny with respect to the use of the groundwater insofar as it does not conflict with the basic laws and policies of the state of Kansas. It is, therefore, declared that in the public interest it is necessary and advisable to permit the establishment of groundwater management districts.*

Chapter 82a – Waters and Watercourses
Article 12 – Groundwater Exploration and Protection
Hazard Addressed – Water Quality

82a-1201 - Title. *This act shall be known as the "Kansas groundwater exploration and protection act."*

82a-1202 - Declaration of purpose. *It is the purpose of this act to provide for the exploration and protection of groundwater through the licensing and regulation of water well contractors in Kansas to protect the health and general welfare of the citizens of this state; to protect groundwater resources from waste and potential pollution by requiring proper description of the location, drilling and well construction, and proper plugging of abandoned water wells and test holes; and to provide data on potential water supplies through well logs, well pumping tests and water quality tests which will permit the economic and efficient utilization and management of the water resources of this state. In order to achieve these objectives, this act requires licensing of water well contractors; provides for the establishment of standards for well construction, reconstruction, treatment and plugging; requires each licensed water well contractor to keep and transmit to the state, upon request, a copy of the log of the well, pump test data if available, and water quality samples; and maintains within the state geological survey of Kansas a record system of well logs and water quality data which will be available to the public.*

Chapter 82a – Waters and Watercourses
Article 14 – Weather Modification
Hazard Addressed – Hail, drought

82a-1401 – Title: *This act shall be cited as the "Kansas weather modification act."*

82a - (a) *At the direction of the Kansas Water Authority, the director may issue licenses for weather modification activities, as provided for in this act... (d) In order to assist in expanding the theoretical and practical knowledge of weather modification, the authority, to the extent that funds are available therefor, may cooperate with, support, participate in and promote research, development and operational programs in: (1) the theory and development of weather modification, including those aspects relating to procedures, materials, ecological effects and the attendant legal and social problems; (2) the utilization of weather modification for domestic, municipal, agricultural, industrial, recreational and other beneficial purposes; and (3) the protection of life, health, property and the general environment.*

Footnotes:

[1] There are many variations on the definition of the term "hazard mitigation." The definition given here is that adopted by the Kansas Hazard Mitigation Team at its meeting of September 7, 2000. The Team formulated this definition specifically to help guide the subsequent planning effort because it established the boundaries for the group on what actions would be considered mitigation actions.

[2] See for example **Staff Final Report to the Kansas Corporation Commission on the Adequacy of Future Kansas Electric Generation Capacity" Docket # 99-GIME-321-GIE. July 8, 1999.**

[3] Ohlmacher, Gregory C., Kansas Geological Survey, "The Need for a Geologic Hazards Program in Kansas." Open File Report 2000-57, October 2000.

[4] For example, historic structure damage in the 1993 great flood included:

- Three registered historic structures were damaged: A registered National Landmark Farmstead, a Corps of Engineers historic barge, and a bridge tenders cottage in Leavenworth.
- There was a special National Park Service appropriation to address flood damaged historic properties. $30,000 went to the bridge tenders cottage for relocation and rehab after the flood.

[5] "An Evaluation Checklist For Review of State Hazard Mitigation Plans," FEMA Mitigation Directorate, September 1999.

The Kansas Hazard Mitigation Team

Rev. 2

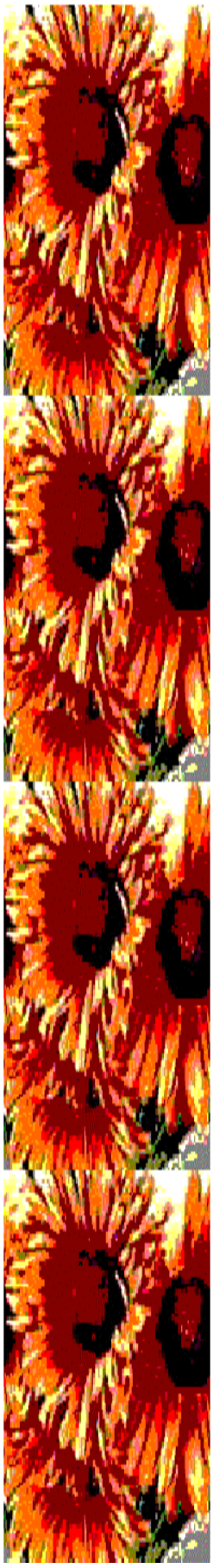
January 2002

The Kansas Hazard Mitigation Strategy

Part 2

Hazard Identification and Vulnerability Assessment

INTRODUCTION: *Hazard Identification and Vulnerability Analysis*



A critical aspect of developing, implementing and maintaining the Kansas Hazard Mitigation Strategy is to define the hazards that threaten the people, property and environmental resources of the state. This part of the strategy describes the Kansas Hazard Mitigation Team's analysis of the natural, technological and criminal hazards that are considered to be of priority concern.

There are several important considerations that frame the identification and assessment of the hazards threatening the communities of Kansas, as follows:

- ✓ When considering the human, economic and environmental impacts of disasters and emergencies, the origin of the event is not as significant as its effect. Therefore, the KHMT has chosen to address all types of disasters: Natural, technological and criminal, recognizing that mitigation efforts for one may also be beneficial in avoiding or minimizing the impacts of another.
- ✓ As a practical matter, the time and effort of the KHMT must be directed at the hazards that pose the greatest "*risk*" for Kansas. This means that attention needs to be directed at those disasters that occur the most frequently and have most severe consequences. Therefore, the KHMT has assessed and prioritized the hazards to guide its mitigation planning and programming efforts more effectively.
- ✓ The magnitude of the impact of a disaster event is related directly to the vulnerability of the people, property and the environment to its effects. This is a function of when the event occurs, the locations or community sectors involved, the resistance of the community to the event's impacts, and the effectiveness of the emergency response and disaster recovery efforts. Ultimately, it is most important for the KHMT to identify how the community is vulnerable to the impact of the event, which will allow methods to eliminate or minimize those vulnerabilities to be defined and incorporated into the KHMT's planning efforts.
- ✓ Theoretically, it is most desirable to completely and fully analyze each hazard threatening the state. This means specifically defining all of the hazards threatening the state, the locations or sectors of the community to be impacted by those hazards, the frequency and severity of the hazards' occurrence, and how, in all its forms, the event adversely affects the community. Practically speaking, the information or resources are not available to achieve this level of analysis. Nevertheless, if Kansas is to have more disaster resistant communities, the type of mitigation planning and programming envisioned by this strategy must proceed based on a more approximate level of analysis.
- ✓ Like any other aspect of planning, hazard identification and vulnerability assessment is an ongoing process. This strategy incorporates efforts to not only continually improve the knowledge of the KHMT regarding the hazards known to threaten the state but also to assess new technologies and environmental data to determine if heretofore unidentified natural, technological, or criminal hazards need to be addressed by the Kansas Hazard Mitigation Strategy.

SECTION 1.0 *Introduction and Purpose*

This is Part Two of the Kansas Hazard Mitigation Strategy and it describes and analyzes the hazard threatening the State of Kansas. The information presented in this part of the strategy is used to define actions by the KHMT and its participating agencies that need to be undertaken to avoid or minimize the vulnerability of the state's communities to those hazards. There are several purposes for presentation of the information given in Part Two. These include:

- ✓ To define the most significant natural, technological and criminal hazards threatening the state,
- ✓ To describe how the communities of the state may be vulnerable to those hazards, using both historical information and predictive techniques,
- ✓ To prioritize those hazards for attention in the KHMT's planning process using a methodical process, and
- ✓ To identify the types of mitigation initiatives that the KHMT considers to be reasonable and effective approaches for avoiding and minimizing the vulnerabilities to the impacts of the hazards.

Overall, the information incorporated into Part Two of the Kansas Hazard Mitigation Strategy is intended to be useful to state officials, local governments, and the general public. It is intended to provide information about specific hazards so that community members will have an opportunity to understand how their health, safety, and welfare may be threatened and why it is important to plan and implement mitigation initiatives at all levels of government and throughout the community. It is also intended to provide ideas on the types of mitigation initiatives that have been considered by the KHMT for each identified hazard and the priority given to the benefits to be derived from each type of initiative. In this way, the KHMT members, state agencies, and local governments can recognize, in advance, the viewpoint placed by the KHMT regarding the value of investing Federal and state mitigation grant funds in such initiatives.

In the sections that follow, the hazard categories of concern are identified and the KHMT's priorities for addressing those hazards are described. This information is followed by a more detailed discussion of each of the priority hazards. Individual sections give information about the hazard and its potential impact in Kansas, the vulnerabilities of the state to that hazard, and possible mitigation initiatives that KHMT considers as beneficial in avoiding or minimizing the vulnerabilities to those hazards.

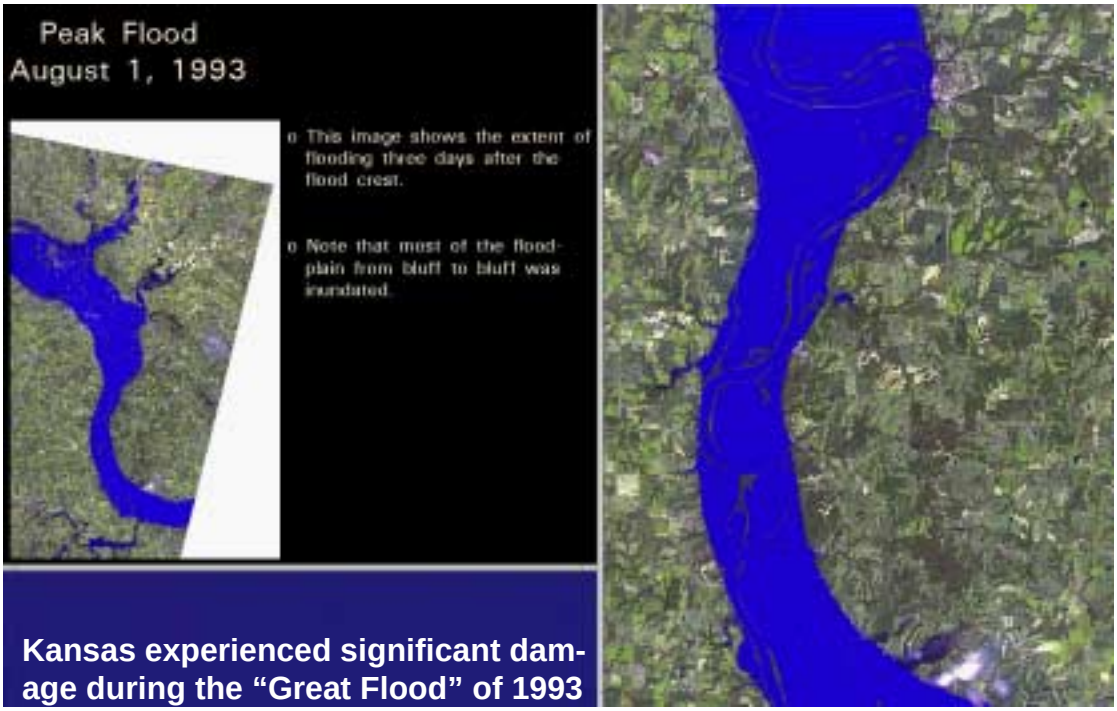
SECTION 2.0 Identification and Prioritization of Hazards

This section identifies the natural, technological and criminal hazards incorporated into the Kansas Hazard Mitigation Strategy, and defines the current priority for attention assigned to each by the KHMT. In presenting these decisions, it is first important to recognize how the decisions were formulated. As an interagency state level committee, the KHMT represents a broad range of expertise and interest re-

lated to hazard mitigation programming. In its process to identify and categorize all of the natural, technological and criminal hazards threatening Kansas, the KHMT worked as a single group, exchanging information and viewpoints during a facilitated consensus process to reach decisions on the hazards to be addressed and the priority for each. As such, whether adequate quantitative factual information was available to support analysis of a hazard, or if the KHMT members had to rely on their judgment of more qualitative information, the outcome of the analysis process represents an objective assessment of the vulnerability of the State of Kansas to each hazard under discussion.

2.1 The Hazards Threatening Kansas

This section lists the individual hazards defined by the KHMT to be addressed in the Kansas Hazard Mitigation Strategy. In deciding to discuss hazards as individual categories, it must be emphasized that this division is somewhat artificial and used only to facilitate analysis. That is, the impacts from one category of event can result in impacts caused by another category of event. Numerous examples of this linkage between disaster types can be given. Drought events typically lead to wildfire events. Severe winter storms usually lead to damage or failure of components of the infrastructure. Similarly, some events involving infrastructure failure can lead to hazardous materials accidents. Nevertheless, describing the potential impacts of individual types of events, the vulnerabilities to those impacts, and possible mitigation initiatives to avoid or minimize those vulnerabilities, can be very beneficial to developing and implementing state and local mitigation plans. Avoiding or minimizing vulnerabilities to one type of hazard will readily lead to minimizing vulnerabilities to other types.



Kansas experienced significant damage during the "Great Flood" of 1993

2.1.1 Hazard Identification

Based on the experience of the representatives of the KHMT participating agencies, sixteen specific hazards have been identified as threatening all or significant portions of the State of Kansas, and pose a sufficient level of human, economic and/or environmental risk to the communities of the state that they warrant incorporation into the Kansas Hazard Mitigation Strategy.

The defined hazard categories are listed in this table.

Natural Hazards	*Technological Hazards*	*Criminal Hazards*
ATMOSPHERIC HAZARDS ✓ Tornado ✓ Winter storms, damaging winds and hail ✓ Extreme temperatures	✓ Dam Failure ✓ Power / Infrastructure failure ✓ Water contamination ✓ Hazardous Materials	✓ Terrorism ✓ Civil Disorder
GEOLOGIC HAZARDS ✓ Earthquake ✓ Subsidence ✓ Landslide/erosion ✓ Expansive soils		
HYDROLOGIC HAZARDS ✓ Flood ✓ Drought ✓ Wildfire		

2.1.2 Priority of the Hazards

The challenges in prioritizing the hazards for purposes of development and implementation of the Kansas Hazard Mitigation Strategy are recognized by the KHMT. These include:

- There is a wide variation in information and data currently available regarding different categories of hazards to allow direct, quantitative comparison,
- While Kansas has experienced many different types of major disaster, significant disaster events in some of the defined hazard categories have not yet occurred. Nevertheless, the risk they pose to Kansas is high enough that these types of events must be considered.

- Different communities in Kansas are have different vulnerabilities to the defined hazards, and a priority formulated for one area of the state may be inappropriate for another, and
- Factors other than risk are appropriate to consider in prioritizing the hazards that are related to state and local capabilities to implement the Kansas Hazard Mitigation Strategy, such as the legal authorities to develop and implement programs, the availability of funding, etc.

The KHMT, in a facilitated workshop, examined a summary of available information on the principal hazards of concern to the state. The group prioritized hazards based on a ranking of importance and vulnerability of the state, from each KHMT agency's perspective. Numerical criteria for judging priority were frequency of past occurrence, the magnitude of the impact of past events, the potential for future impact, perception of level of threat, availability of program resources and existing priority for Kansas' agencies. Working together, the KHMT members derived the following priorities, as a result of this process (descending order, from highest priority to lowest):

1. Flood
2. Tornado
3. Water contamination
4. Winter storm/hail
5. Drought
6. Hazardous materials
7. Extreme temperatures
8. Wildfire
9. Terrorism
10. Erosion
11. Dam failure
12. Subsidence
13. Landslide and civil disturbance (tie)
14. Earthquake
15. Power/infrastructure failure

A thunderstorm over the Kansas City area

These priorities will be a factor considered by the KHMT when evaluating program options, defining implementation tasks for the strategy, allocating agency resources, and assessing mitigation grant applications.

Information regarding these hazards, the threat they pose to Kansas' communities, and potential initiatives to mitigate their impact are discussed in the remainder of this section.

SECTION 3.0 Assessment of the State's Vulnerability

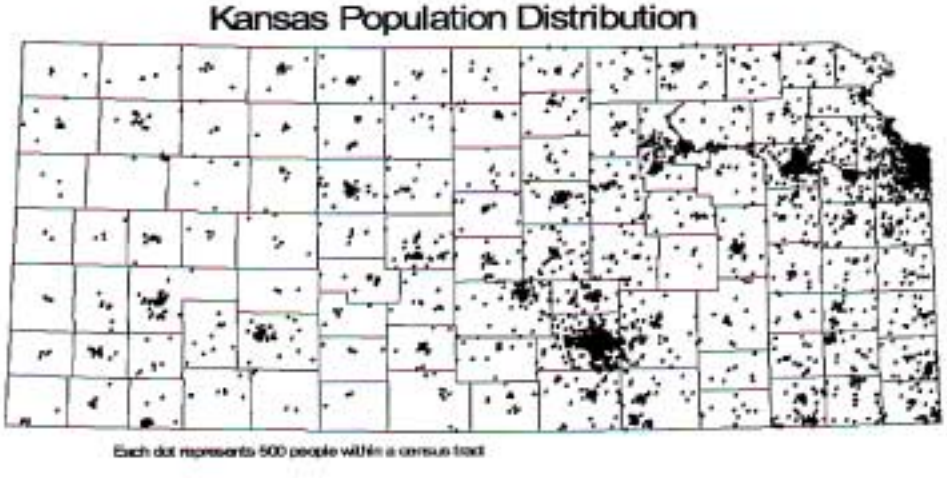
This section of the Kansas Hazard Mitigation Strategy summarizes the vulnerability of the state to the identified hazard. The capabilities of the KHMT participating agencies to undertake this vulnerability assessment vary with the information available regarding the specific hazard. Generally, however, the process has been completed by summarizing the history of the occurrence of the specific hazard in Kansas, assessing the known or likely impact of the hazard on human health and safety, on the state's economic vitality, and on valuable environmental resources. In addition, at the conclusion of the discussion of each hazard, general suggestions regarding mitigation initiatives are provided to indicate to state and local officials the types of structural or non-structural actions that the KHMT believes are appropriate to reduce the identified or predicted vulnerability indicated.

The information to support the vulnerability assessment summarized herein is presented in summary format. Depending on the hazard under discussion, one or more of the KHMT participating agencies may maintain a database of relevant information. If so, reference to that database is provided.

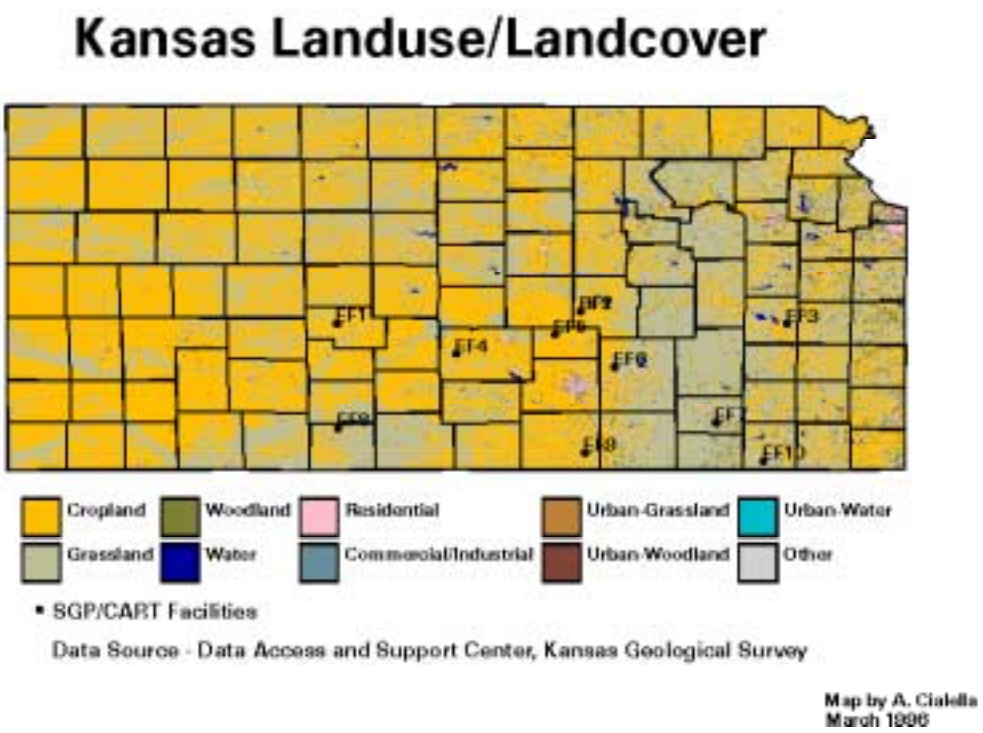
3.1 Overview of Kansas' History with Disasters

The demographic and environmental features of the State of Kansas are an important element in understanding the state's vulnerability to disaster.

The 2000 estimated population of Kansas' 105 counties was 2,688,418 and state surface area in square miles is 82,282, providing for an average population density



of 32.7 per square mile. Of the land surface, 65 percent is utilized as cropland, 30 percent as pastureland and rangeland; and two percent as woodland.



As of 1990, About 67.9 percent of the population were considered homeowners, and of the estimated 946,253 households average 2.53 persons in size. The median household income in 1995 was $32,114. Eleven percent of persons of all ages live below the poverty level, and 14.9 percent of children under 18. Children under five years of age represent 18 percent of those living in poverty conditions.

College graduates over 25 in 1990 represented 21.1 per cent of the population and 81.3 per cent were high school graduates. Racial/ethnic demographics are estimate as follows: 91.5% White, 5.9% Black, 5.3% Hispanic, 1.8% Asian or Pacific Islander, and .9% American Indian, Eskimo or Aleut. The median age was 34.3.

1995 figures indicated that 26 of Kansas' 105 counties had population densities of less than 5 persons per square mile, with the most densely populated being Wyandotte with 1018.7 persons per square mile. The most populous cities are Wichita, Kansas City Metro area and Topeka.

Most of Kansas is drained by the Kansas River and its tributaries that flow east through the northern part of the state, and the Arkansas River and tributaries that flow southeast through the southern part of the state. Cold winds move down from the north, and hot summer winds blow up from the south. Most precipitation falls during the growing season of April through September.
Both an agricultural and industrial state, Kansas produces livestock, wheat, sorghum grain, hay, and corn. Aircraft and other transportation, telecommunications,

health services, food processing, and meat packing are the businesses representing most of the top 25 Kansas companies.

The state's long and active history with experiencing disasters has been documented back to the Civil War era. A single, symbolic measure of the severity of the state's more recent experience could be considered declarations by FEMA of a major disaster for Kansas. Since 1973, Kansas has experienced 15 "declared" and at least 13 other major disaster events. Nearly all were associated with severe storms, flooding and tornadoes.

More information on Kansas' experience with disasters is provided within the following discussions of individual hazards. For purposes of this document, natural hazards will include three general categories: Atmospheric, Geologic and Hydrologic Hazards. The category of technologic hazards will include potential hazards of dam failure, power/infrastructure failure, water contamination, and hazardous materials. The area of criminal hazards will include discussions of terrorism and civil disturbances.

3.2 The Vulnerability to Natural Hazards – Atmospheric Hazards

Kansas is vulnerable to the impacts of several "atmospheric hazards." These are tornadoes, winter storms, damaging winds and hail, and extreme temperatures.

3.2.1 Tornadoes

The State of Kansas is situated in an area that is generally known to forecasters and the public as "Tornado Alley". Climatological conditions are such that warm and cold air masses meet in the center of the country to create conditions of great instability and fast-moving air at high pressure that can ultimately result in formation of tornado funnels. When funnels touch the ground, whirling at speeds from 72 mph to more than 260 mph, they are capable of creating mass destruction.

Figure 1.2 Wind zones in the United States

Source: The Tornado Project

These are some of the statistics associated with living in "Tornado Alley":

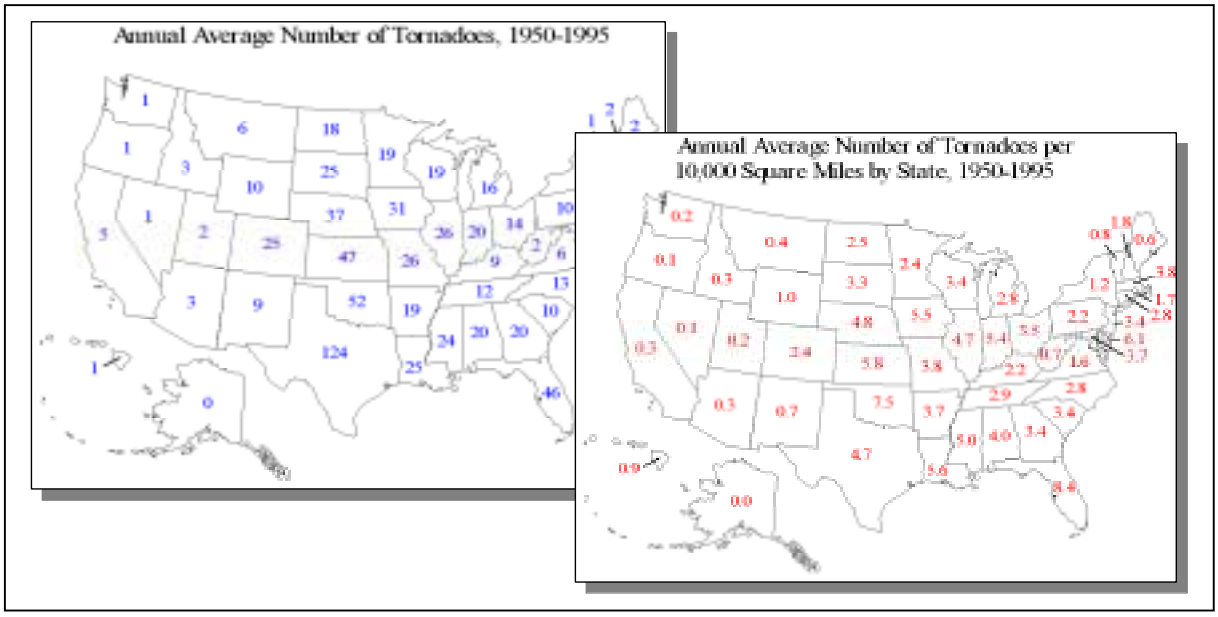
- Kansas was hit by 2149 tornadoes between 1950-1996
- Kansas ranks third in tornado activity in

the US

- At least four F5 and one F4 tornadoes have struck Kansas
- Tornadoes hit again in 1999 and 2000
- Kansas ranks fifth in annual tornadoes per 10,000 square miles
- Of the 800 tornadoes recorded in the US annually, an average of 47 hit Kansas.

These maps indicate the relative extent of Kansas' vulnerability to tornadoes in comparison to other states.

The vulnerability of Kansas to tornadoes can also be seen from a recap of some recent events. A tornado striking May 25, 1955 and impacting Kansas ranks sev-



enth among the deadliest tornadoes recorded since 1950, when the death toll reached 81. This one is also included on the list of the National Weather Service's F5 rated on the Fujita Damage scale, which means wind speeds reached at least 260 mph. More than 270 persons were injured.

Three other F5 tornadoes are notable in more recent Kansas history. The first, on June 8, 1966, hit Topeka killing 17 and injuring 550. On March 13, 1990, a tornado struck in Hesston where two people were killed and the town was destroyed, while also hitting Goessel. The third event, on April 26, 1991 in Wichita/Andover where 20 persons were killed, and one person was killed in both Elk and Cowley Counties. Reports said it was on the ground for about 50 minutes and was responsible for 302 injuries. The largest number of tornadoes, 116, struck Kansas in 1991.There was one death on May 7, 1993 in Russell County from a tornado event, and additional tornadoes in Lake Perry as well as Sabetha. An F3 twister hit Sumner County on May 25, 1997.

On May 3, 1999, Kansas experienced another deadly tornado, an F4, which killed six persons in Sedgwick County and caused more than 150 injuries over four counties. As winds reached 300 mph from this series of tornadoes that blew across Oklahoma, Tennessee and Texas as well, it was reported that all tolled states lost 4000 homes damaged or destroyed, 55 people and losses of $1.5 billion. FEMA has called this outbreak of events the most devastating in 20 years. This year, 2000, Crawford, Labette and Neosho Counties were declared disaster areas as a result of tornadoes on April 19-20. The most recent tornado on May 12, 2000 killed one person.

Some other information illustrative of Kansas' vulnerability to this type of disaster are the facts that 71% of all tornadoes, 93% of tornado related deaths, and 88% of tornado related injuries occurred during the months of April, May and June in Kansas. However, tornadoes have struck in every month, except for January since 1950. Most tornado events occur between 3:00 pm and 9:00 pm.

Tornadoes occur throughout Kansas, but on average the eastern and central sections – the most heavily populated areas of the State – have more tornadoes than the west. Finney County has had the most tornadoes, with a total of 68 up until 1998; while as few as seven have been reported in Wyandotte County.[1] Tornadoes can occur anywhere in the state, rendering all Kansas residents, more than 800,000 single-family homes and 70,000 mobile or trailer homes, most businesses, all critical facilities and infrastructure vulnerable to their impacts.

Specifically, health and safety vulnerabilities important to Kansans can be summarized as follows:

- Kansas averages four deaths and 50 injuries annually. Fatalities from tornadoes through 1994 placed Kansas eighth with 199, and 14th in injuries with 2267 recorded
- Kansas ranks third for risk of death in any one year or 1 in 508,584
- Kansas ranks third for risk of injury in any one year which is one in 44,409
- Fatalities from 1950 through 2000 were 206 persons
- Injuries for the same period were 2417

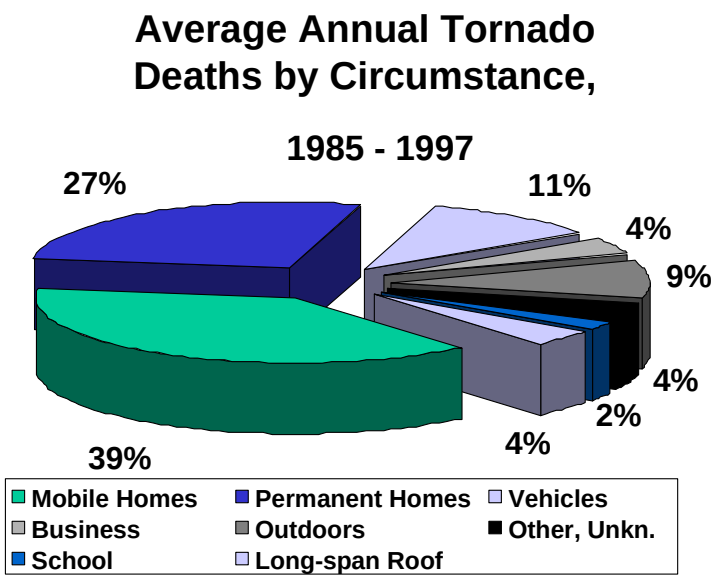
The vulnerability of the state's economic vitality to tornadoes needs to be recognized as well. Kansas ranks third in the cost of tornado damages from 1950 to 1995, at $1,216,363,776, and its cost adjusted losses annualized equal $26,442,688.[2] The cost per person each year for tornadoes is $12.02, *ranking Kansas number one in the country in the cost to its citizens for tornado damage.*[3]

[1] Kansas Hazard Mitigation Plan, Oct. 1999, p. 30.
[2] http://disastercenter.com/kansas/tornado/html
[3] ibid.

In addition to damage caused by wind, thunderstorms associated with tornadoes sometimes bring heavy rains, damaging hail and flooding. Both flying debris and flooding are the cause of considerable damage and injuries associated with tornado events.

In 1999, at least 3347 homes were affected plus 27 businesses destroyed in Haysville, three churches, a library, a senior home and a Masonic lodge. As many as 8400 structures, primarily in the Wichita area were impacted including 1100 destroyed, 2240 suffering major damage and 5126 suffering minor damage.

Mobile and manufactured housing is particularly vulnerable in tornadoes and heavy windstorms. There are 230 mobile home parks in Kansas; 19 in Topeka and 37 in Wichita, 12 in Kansas City. In 1990, Kansas ranked 31st in the US in the number of mobile homes, which represented 6.8% of all residential units. From 1980 to 1990, the number of mobile homes and trailers grew by 19,113 units, to 71,195. The chart here indicates that the highest numbers of deaths are mobile home-related, based on national data.



Valuable environmental and cultural resources in Kansas are also vulnerable to tornadoes. Parks and recreation areas, forested and timbered lands, wildlife, and crops can easily incur damage. In addition, there are valuable historic structures that have suffered tornado damage.

Potential tornado mitigation initiatives:

Damage teams assessing the impact of the 1999 tornadoes concluded that structural damage could have been reduced or avoided if newer building codes and engineering standards for high wind events had been adopted, followed and enforced. Many building failures resulted from improper construction techniques, poor selection of construction materials and ineffective detailing of connections.

Since manufactured and mobile homes are particularly vulnerable to high wind speed, anchors and tie-downs are helpful to minimize damage from high wind events. However, to reduce the potential for injuries or fatalities, mobile and manufactured homes need nearby storm shelters or buildings with “safe rooms.”

Other potential mitigation initiatives that could be beneficial to minimizing the vulnerability to tornadoes are given on this table:

MITIGATION INITIATIVES FOR TORNADOES

Possible Program Mitigation Initiatives **NON-STRUCTURAL INITIATIVES**	Higher Priority for KHMT consideration (✓)	Suitable for Local Program Initiative
Conduct wind/tornado vulnerability engineering studies on government owned and critical facilities		**Yes**
Develop and promulgate requirements for tornado warning capability in facilities of high vulnerability (e.g., hospitals) or posing heightened risk from damage (e.g., HazMat facilities)	✓	
Conduct mitigation/preparedness training programs for tornado/high winds for the public, administrators of institutions, local government officials, etc.		**Y**
Develop incentive programs (taxes, insurance, etc.) for tornado mitigation efforts		
Promulgate building and land development code changes regarding tornado mitigation (safe rooms, on-site sheltering for mobile home parks, etc.)	✓	
Promote public education and citizen training programs in immediate tornado impact response such as Community Emergency Response Teams (CERT)		**Y**
Fund research for better building systems that can withstand high winds		
Incorporate wind proof construction techniques into all new government facilities		**Y**
Require all new government facilities to have roof to foundation tie-down systems	✓	**Y**
STRUCTURAL INITIATIVES		
Retrofit government facilities to include safe rooms or on-site sheltering and incorporate into new facility construction	✓	**Y**
Retrofit government facilities for improved wind resistance in roof structures	✓	**Y**
Retrofit or install tie down systems in mobile home parks	✓	**Y**
Retrofit portable government and school buildings with tie downs		**Y**
Install tornado warning systems in all critical facilities, vulnerable facilities, etc.	✓	**Y**
Relocate utility service to critical facilities to below grade		**Y**
Implement tree removal/trimming projects and debris removal projects		**Y**

3.2.2 Winter Storm/Damaging Winds/Hail

Severe storms, such as blizzards, thunderstorms with high winds and lightning, and damaging hail are hazards that threaten Kansas, and need to be addressed in mitigation programs.

Some of the highlights of historic information on past winter storms in Kansas include:

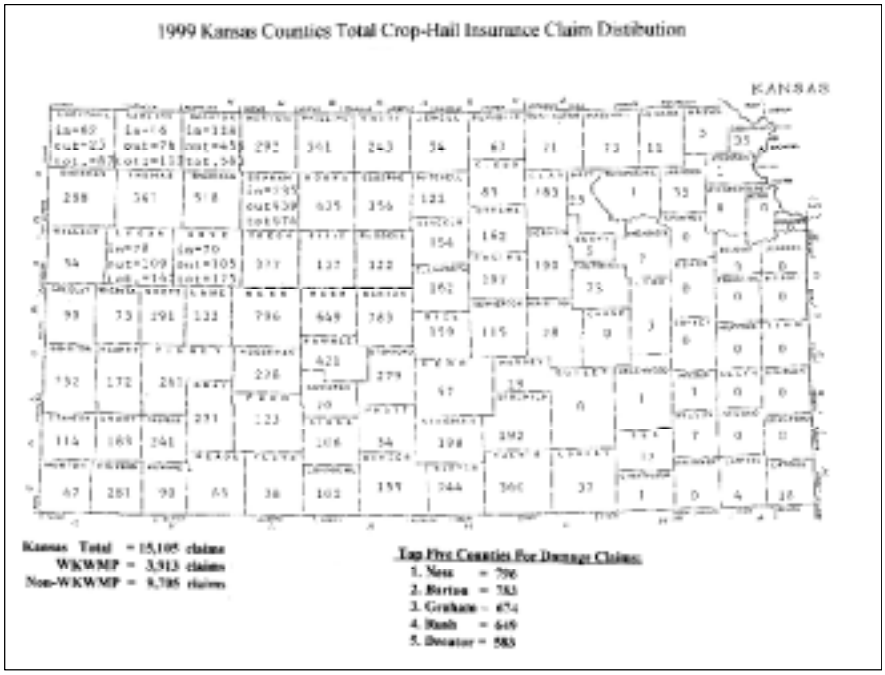
- Dodge City got 17.5 inches of snow in 24 hours in 1922
- Ice storms in January, 1974 and December, 1978 were major events
- 20” of snow fell in Kansas and thick ice covered eastern Kansas in 1984
- A blizzard hit western Kansas and 78 mph winds were recorded in Dodge City in 1987

- In 1989 a blizzard struck western Kansas and a second one struck with 50 mph winds in Goodland, massive drifts, thousands of animals killed and 30-foot drifts in northwest Kansas

The summer season has its own hazard as well, in the form of hailstorms. Hail accompanies many thunderstorm events, such as the 1999 tornado episode. The largest hailstone ever measured in the US fell at Coffeyville, Kansas, on September 3, 1970: 1.67 pounds and 17.5 inches in circumference. In 1991 a hailstorm hit Lawrence with walnut-sized to golf ball sized hail, in conjunction with a series of tornadoes in Pratt and Reno counties. Hail storms in 1998 hit Beagle (3/4" hail), Maryville (1.5") and Oberlin (2").

At least 55 damaging hailstorms have been recorded from January 1998 to December 1999.[4] A major storm occurred on May 16, 1999 that hit Greeley, Wichita, Scott and Lane Counties, just as one did in May 1977.

Populations, crops, property and valuable environmental resources throughout the state are vulnerable to these events. Because these hazards may strike anywhere is Kansas, people who are already in vulnerable states of health or poverty may feel effects of severe storms more intensely. Based on data following, it might be expected that about 25 people per year will die and 1800 will be injured as a result of these hazards. The economic sector may suffer with business closings or losses of crops and livestock, and infrastructures may fail. Hail has been shown to have a significant impact on agricultural, as well as property damage. In Kansas, the majority of property damage claims due to hailstorms are filed for May, June and July, with June accounting for half of all claims. During 1999, the top five counties for Total Crop-Hail insurance claims were Ness, Barton, Graham, Rush and Decatur. The weather modification program in western Kansas was very active in hail suppression efforts.



Health and Safety concerns from such weather conditions are traffic accidents, injury or illness from storm-related infrastructure failure. In the 10-year period from 1990 to 2000, national data indicates a total of 18,205 persons injured in accidents involving snow, ice, freezing rain, hail, sleet or fog or combinations thereof. An

[4] Kansas Geological Survey

estimated 253 persons died. This total represented 219 fatal accidents and 12,562 injury accidents. Kansas experienced about 234 deaths and injuries from lightning during the period 1959 to 1994, a number placing the state in about the 50% percentile nationally.

Winter storms, high winds, lightning and hail can cause direct property damage as well as economic damages due to disruption to business operations. It is estimated that $1 billion in damages is incurred annually to crops and property in the US from hailstorms alone, and an unknown amount to natural vegetation. Lightning can destroy valuable electronics, communications, and electrical power system components, causing significant disruption in the community. Additionally, transportation and power system failures from hail and snow, ice or windstorms can affect the economic vitality of business and agri-business communities.

Potential winter storms, high wind, lightning and hail mitigation initiatives

The Kansas Water Office under the Kansas Weather Modification Act (KSA 82a-1401) may license and issue permits for the cloud seeding program of the Western Kansas Groundwater Management District No. 1. New state funding is available for this program which has reduced crop hail damage by 49 percent in the target area so far, indicating its potential value from reducing the economic vulnerability to this hazard.

Some other potential mitigation initiatives that can be considered for this category of hazard are summarized on this table:

MITIGATION INITIATIVES FOR WINTER STORM/HAIL

Possible Program Mitigation Initiative **NON-STRUCTURAL INITIATIVES**	Higher priority for KHMT consideration. (✓)	Suitable for Local Program Initiative
Develop and implement public education program on safety and health issues involved in winter storms, especially for populations at risk		**Y**
Research feasibility of expanding weather modification (cloud seeding) programs for snow and hail		
Expand participation in agricultural insurance programs for snow, ice and hail damage		**Y**
Develop state emergency response procedures and plans for blizzard/ice events, e.g., livestock rescue, support programs for the elderly, etc.		**Y**
Develop a travelers warning/road closure system for early use in predicted events		
Provide a state-employee program for response to winter storm warnings and state agency closures		
Develop and give public safety programs on lightning safety, property protection, and electronic protection		

MITIGATION INITIATIVES FOR WINTER STORM/HAIL (Con't.)

Possible Program Mitigation Initiative	Higher priority for KHMT consideration. (✓)	Suitable for Local Program Initiative
NON-STRUCTURAL INITIATIVES		
Identify transportation routes for early snow/ice clearance to minimize closure or lack of access to critical facilities, schools, business centers, major employers, etc.	✓	**Y**
STRUCTURAL INITIATIVES		
Construct, install and/or equip shelter-type facilities along major transportation routes for travelers and to facilitate roadway closure		
Purchase and/or install remote operating warning signs on major highways to facilitate road closure and sheltering of travelers	✓	
Equip critical facilities with standby electric power generation	✓	**Y**
Purchase additional/improved equipment for snow removal, sanding, etc.		**Y**
Equip critical communications centers with lightning protection		**Y**

3.2.3 Extreme Temperatures

Heat waves and unusually cold weather are considered a hazard by the KHMT warranting consideration in the Kansas Hazard Mitigation Strategy, principally because of vulnerabilities to the health and safety aspects of this hazard and the potential economic impact. Heat waves can be closely associated with drought, while extreme low temperatures may be associated with winter storms or occur as separate atmospheric events.

Some temperatures profiles of Kansas cities:

Topeka
Average High Temp: July, 89.3°
Average Low Temp: Jan. 16.3°
Highest Temp: July 114°
Lowest Temp: Dec. -26°
Mean # of days/yr below 32° = 120

Dodge City
Average High Temp: July, 92°
Average Low Temp: Jan. 18°
Highest Temp: July, 109°
Lowest Temp: Dec. -21°

Wichita
Average High Temp: July, 92.8°
Average Low Temp: Jan. 19.2°
Highest Temp: July, 113°
Lowest Temp: Feb. -21°
Mean # of days/yr below 32° = 111

There have been at least two major extreme temperature events in the last 20 years that have caused death and damage in the Central US, including Kansas. Heat waves are often associated with drought, and heat waves can have a profound effect on water supply due to evaporation from reservoirs.

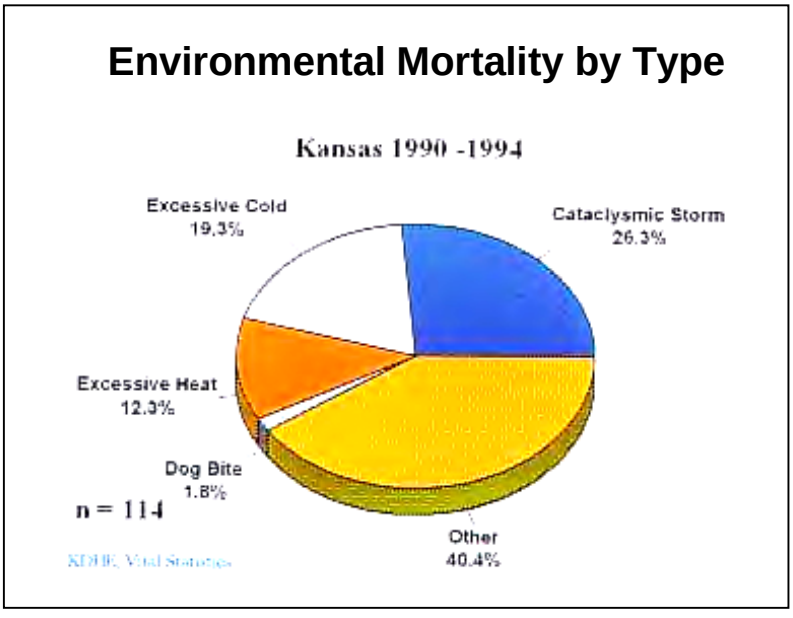
From June to September, 1980 approximately 10,000 persons perished from heat stress-related conditions, and an estimated $44 billion (TD) in damages to the agricultural and related industries occurred. More than 1000 people died during the July, 1995 heat wave that hit the Midwest. Again in 1988's summer months, the central US was hit with between 5000-10,000 temperature-related deaths, and the toll on agriculture was $56 billion (TD).

Temperature extremes in Kansas up to 1998 were recorded from –40 degrees F. to 120 degrees F. Profiles for three cities are shown in the accompanying illustration.

Extreme temperatures can have deleterious effects on people and the environment. Infrastructure, particularly energy sources can be stretched, and long-term extreme heat can stress water sources, particularly if occurring during a drought situation.

Normally, about 175 Americans die of heat-related illness annually. The death rate escalates with extreme heat conditions. However, there are no firm historical data on deaths or illnesses due to this hazard in Kansas.

By the same token, extreme cold weather can kill as well. While there are no firm data on hypothermia death rates, it is estimated that 25,000 older adults die from hypothermia each year. The National Institute on Aging estimates that more than 2.5 million Americans are especially vulnerable to hypothermia, with the isolated elderly being most at risk. About 10% of those persons over the age of 65 have some kind of temperature-regulating defect, and 3-4% of all hospital patients over 65 is hypothermic. The figure below indicates mortality figures for Kansas' population for deaths related to "environmental" causes:



This figure indicates that deaths from environmental causes may not be large. However, for purposes of the Kansas Hazard Mitigation Strategy, known deaths attributable to extreme temperatures, as well as from severe weather, is a significant portion of this category of fatality.

Prolonged episodes of extreme temperatures can also have significant economic impacts. The last two major heat waves caused extensive crop damage in the Midwest. Heat and drought could stress water use patterns. Since 15% of farm acres are irrigated in Kansas, high water withdrawals and lower recharge could cause declines in groundwater availability, as would increased evaporation in surface water reservoirs.

Severe cold or heat could also place substantial demands on electric power, gas, fuel oil source which, depending on the availability of supplies at the time, could result in higher levels of economic vulnerability as well.

Any community in Kansas would be vulnerable to the impacts of extreme temperatures. However, as noted above, those with a higher ratio of elderly may be more at risk, due to the heightened vulnerability of this segment of the population. Overall, Kansas has an elderly population somewhat above the national average. Approximately 13.5% of Kansas' citizens are over the age of 65, while the national average is 12.7%.

Hotter, drier weather is generally associated with increases in the frequency of wildfires, whereas increased rainfall reduces this frequency.

Potential extreme temperature mitigation initiatives:

Many of the potential mitigation initiatives to avoid or minimize drought or winter storm would be applicable to mitigation of the economic impacts of extreme temperatures. Of most relevance to mitigation the impacts of the health and safety ramifications of extreme temperatures are related to being adequately prepared to prevent or respond to life threatening situations. Some possible mitigation initiatives for extreme temperature are listed here:

MITIGATION INITIATIVES FOR EXTREME TEMPERATURES

Possible Program Mitigation Initiative **NON-STRUCTURAL INITIATIVES**	Higher priority for KHMT consideration (✓)	Suitable for Local Program Initiative
Develop and deliver training program in emergency planning for appropriate local agencies for client services under extreme temperature conditions		
Develop requirement for government regulated agencies, e.g., home health care, aging programs, etc., to have emergency plan for client contact and care under extreme temperatures		**Yes**

MITIGATION INITIATIVES FOR EXTREME TEMPERATURES (Con't.)

Possible Program Mitigation Initiative **STRUCTURAL INITIATIVES**	Higher priority for KHMT consideration (✓)	Suitable for Local Program Initiative
Implement a state wide program and criteria for "extreme temperatures" watch and warning public instructions, for broadcast under specified conditions		
Require county emergency plans' special needs provisions include notification and care for individuals vulnerable to extreme temperatures		**Y**
Develop and deliver training and education to suitable professionals and institutional staff in the recognition and treatment of hypothermia and heat stroke		
STRUCTURAL INITIATIVES		
Equip suitable structures with reliable heat and cooling in vulnerable communities (e.g., elderly impoverished) for use as shelters during extreme temperature episodes		**Y**
Fund and implement a program for statewide and/or local purchase and distribution of air conditioners, fans, heaters, etc. for use by vulnerable households during extreme temperature episodes		**Y**
Provide and implement a retrofit program for homes of vulnerable individuals		**Y**
Establish and construct facilities to support a system for governmental purchase, storage and distribution of heating oil, coal or fire wood for delivery to vulnerable populations during extreme cold events		**Y**

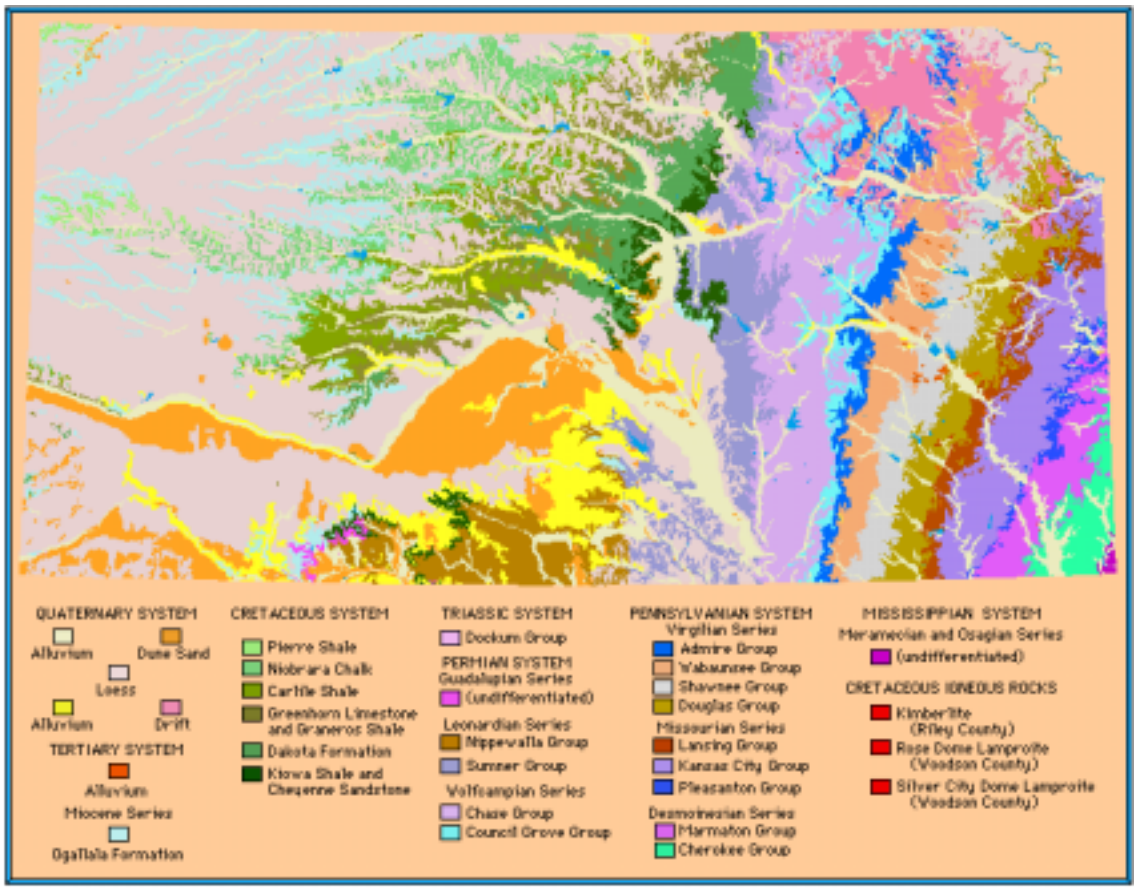
3.2 The Vulnerability to Natural Hazards – Geologic Hazards

The geology of Kansas' surface has been studied for more than a hundred years. And except for a few counties, the bedrock has been mapped in detail. This information is useful partly for a basic understanding of the geological history of the state in order to know where structures such as faults, folds and uplifts exist. The subsurface is a complex place, more so than that visible from the surface. This knowledge is useful in understanding the location and nature of geologic resources and issues related to geologic hazards.

Geologic studies are in progress including mapping and improving county geologic maps, mapping landslide hazards, tracking water resource and water quality issues, improving methodology for locating subsurface voids, examining volcanic pipes that erupted 100 million years ago, mapping and evaluating structural features (faults and folds) associated with the Humboldt Fault Zone that produced the largest historic earthquake in Kansas, and other geologic research.

To date, very little has actually been done to systematically evaluate geologic hazards in Kansas and to developing maps to define areas susceptible to these hazards. Efforts are now planned to develop this information for use by state and local

officials for planning purposes.[5] Although comprehensive, statewide information on geologic hazards in Kansas is not readily available; this section summarizes hazard and vulnerability information on the geologic hazards of concern to the KHMT for the Kansas Hazard Mitigation Strategy. These are earthquake, subsidence, landslides and erosion and expansive soils.

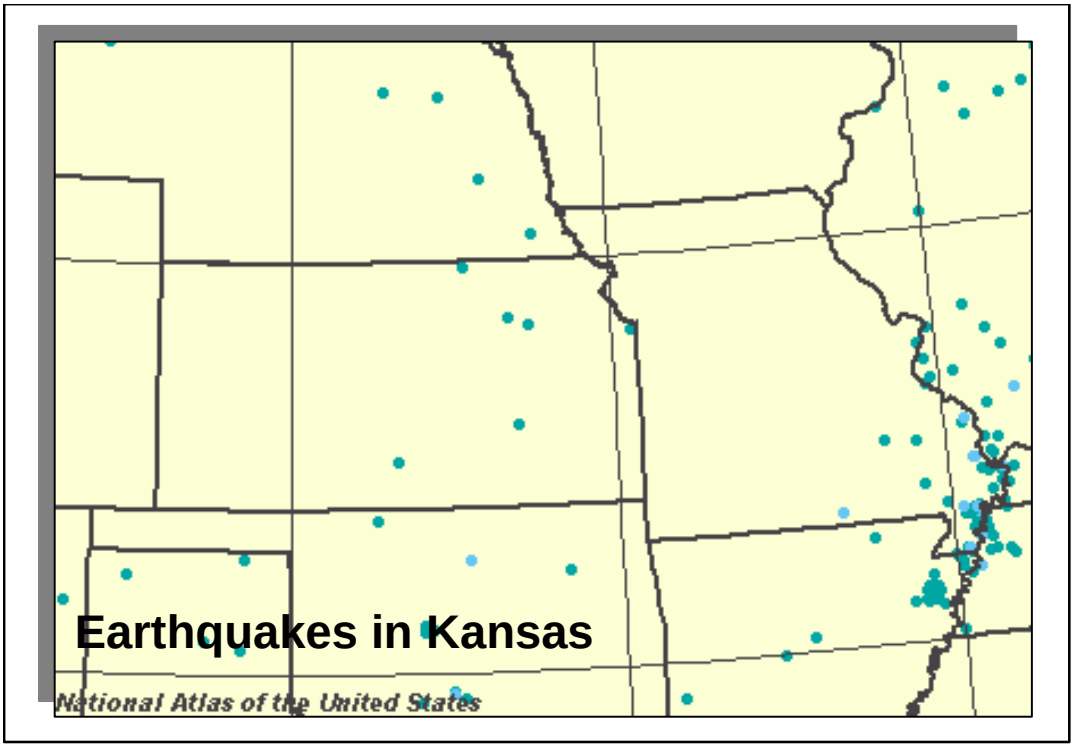


3.2.1 Earthquake

About twenty-five earthquakes were reported in Kansas prior to 1976. The earliest reported and possibly strongest shock reported in Kansas occurred on April 24, 1867. There were several injuries and some damage, as well as a two-foot wave on the Kansas River at Manhattan. The tremor was felt over a 300,000 square mile area in the Midwest. In today's measurement, the magnitude would have been a 5.0-5.5 on the Richter scale.

A moderate quake near Valley Falls north of Topeka occurred on Nov. 8, 1875, and was felt over 8000 square miles, but did little damage. The last shock of the 19th

[5] "The Need for a Geologic Hazards Program in Kansas," Gregory C. Ohlmacher, Kansas Geological Survey. Open File Report 2000-57. October 2000.



Century occurred near Charleston, MO on Oct. 31, 1895, affecting a million square miles over 23 states. The strongest effects were felt in Topeka.

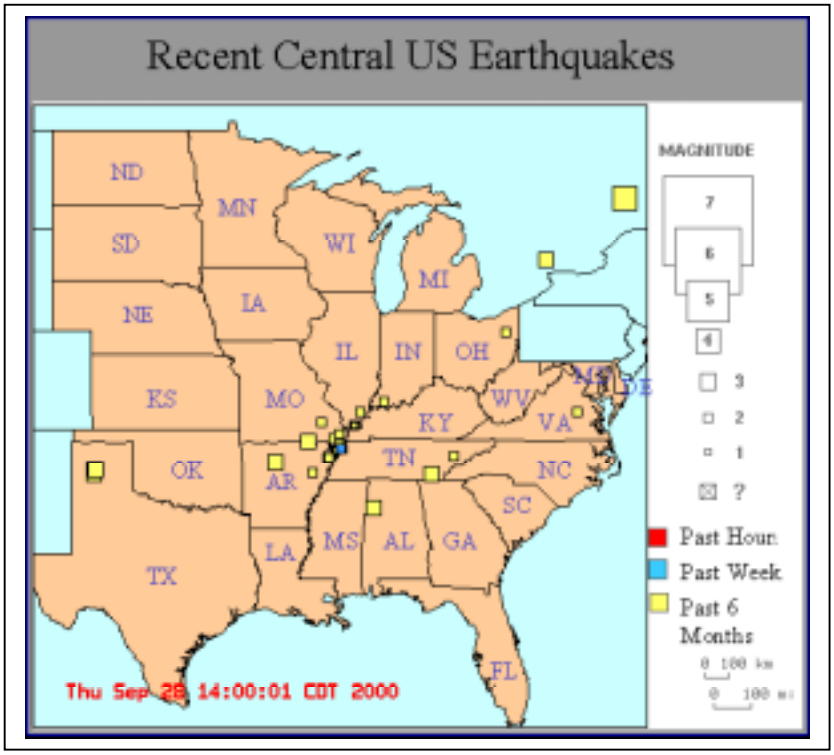
In the 20th Century these earthquakes were reported:

- Dodge City and Meade, Oct. 27, 1904
- Manhattan and Topeka, Jan. 7, 1906
- White Cloud, March 18, 1927
- Manhattan, two on Sept., 23, 1929, one Oct. 21 and one Dec. 7
- Norton and Decatur counties, Feb.20, 1933
- Eastern half of state, April 9, 1952, 5.5 at Medicine Lodge, and strongly at Kansas City
- Coats, Coldwater, Medicine Lodge, Wilmore, Jan. 6, 1956
- Norton County, April 13, 1961.
- Eastern part of Kansas, Nov. 9, 1968, 5.3 magnitude.

Most recently, on May 13, 1999, a 40-block section of Kansas City was shaken by a 3.0 quake. About 100 people evacuated from Indian Springs Medical Building that was damaged in the quake. The epicenter of this quake was in Kansas.

Overall, Kansas is in an area of relatively low seismic activity, although the north-east corner of the state has moderately low activity. FEMA has ranked Kansas 45th among the states in the amount of damaged caused by earthquakes in an average year, while the Kansas City, MO, metro area was ranked 35th among 35 major met-ropolitan areas in the nation for earthquake risk.

The area of Kansas most vulnerable to the impacts of an earthquake would be in the northeast corner of the state. For example, a quake centered in Pottawatomie County has about a two percent probability of occurring during a 50-year interval, but would affect about 28 per cent of the population living in the northeast, or 743,000 people. There has not been extensive use of earthquake mitigation construction techniques in Kansas, because of the perceived low probability of occurrence of a major event. If such an event were to occur, vulnerabilities would include injuries and fatalities from collapsing structures or falling object, as well as health and safety threats from failures of utilities and hazardous materials conveyance or storage vessels, e.g., gas pipelines.



The effects of earthquake could be damage and major disruption to businesses and industries, with loss of revenue and employment.

Dam failures may result from earthquakes, also causing potential public safety and economic impacts to Kansas. There are numerous dams in Kansas, and many have significant down stream populations and are considered high hazard dams.

Other property at risk from an earthquake in Kansas is buildings and elements of the infrastructure. Most homes in Kansas are subject to risk of damage because foundation systems consist of un-reinforced block. Brick and block facades are also popular in Kansas, and are frequently separated from building surfaces, causing life safety hazards to nearby individuals.

Reservoirs and historic building built near fault lines or on unstable soil could be at risk of damage or destruction. Quake-related release of hazardous materials could damage natural resources. Associated landslides, subsidence and quake-related fires can also occur.

Potential earthquake mitigation initiatives:

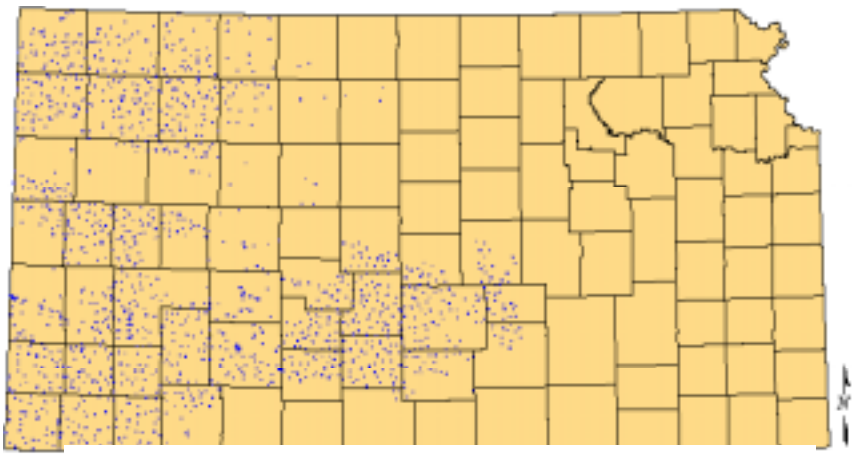
Although the earthquake risk in Kansas is not ranked high by the KHMT for mitigation programming, mitigation initiatives could be considered by state and local planners, particularly critical facilities and infrastructure components existing the higher risk northeastern corner of the state. Examples of a wide range of structural and non-structural mitigation initiatives could be identified from those being considered by nearby mid-western states surrounding the New Madrid fault. A summary of some earthquake mitigation initiatives that could be considered are given here:

MITIGATION INITIATIVES FOR EARTHQUAKE

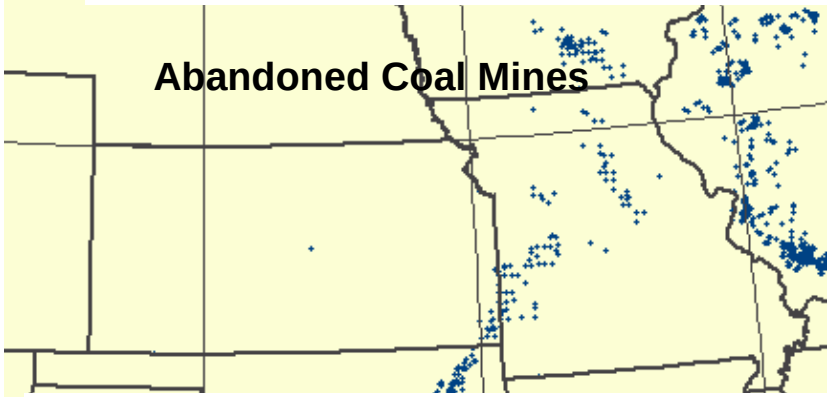
Possible Program Mitigation Initiative **NON-STRUCTURAL INITIATIVES**	Higher Priority for KHMT Consideration (✓)	Suitable for Local Program Initiative
Identify and map areas subject to increased earthquake risk	✓	
Conduct engineering studies and define mitigation techniques that are most cost/effective for the level of risk in Kansas		
Develop and deliver an education program for specific professions on the Kansas earthquake risk, e.g., architects, engineers, etc.		**Yes**
Prepare plans for earthquake response, building inspection, utility restoration to specifically address earthquake risk		**Y**
Develop and/or distribute educational materials instructing the public on how to protect themselves and their homes from the effect of an earthquake		**Y**
Develop and implement a statewide program for inspection and identification of earthquake vulnerable state government facilities and systems		
Identify hazardous materials facilities, transportation systems, pipelines, etc. most at risk from an earthquake; Develop response contingency plans		
Ensure earthquake standard design for transportation routes and critical facilities needed to support an emergency response to a major earthquake		**Y**
STRUCTURAL INITIATIVES		
Retrofit critical governmental structures for greater earthquake resistance	✓	**Y**
Purchase and install an earthquake monitoring system for data gathering and earthquake prediction		**Y**
Retrofit industrial and utility facilities likely to release hazardous materials as a result of an earthquake		**Y**
Retrofit critical utilities to maximize operability after an earthquake		**Y**

3.2.2 Subsidence

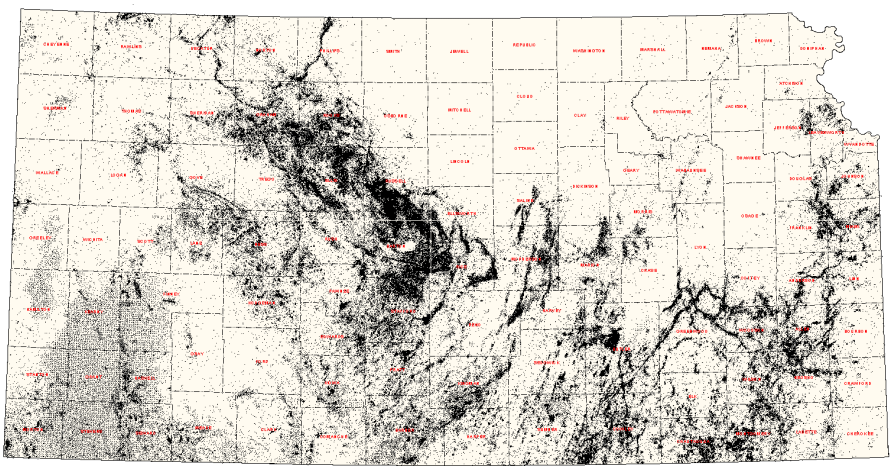
Incidences of subsidence have been recorded in Kansas since 1879, damaging roads, railroads and buildings over the years. Subsidence can be related to mine collapse, water and oil withdrawal, or natural causes such as shrinking of expansive soils and cave collapses. The surface depression is known as a sinkhole.



Water wells in Kansas' High Plains Aquifer



Oil & Gas Well Locations Across Kansas



This map shows the distribution of over 330,000 oil and gas wells in Kansas. Well locations include active, abandoned and all other wells that are in the Conservation Divisions RBDMS. This data is still under developement and subject to change.

Kansas Corporation Commission
Utilities Divison, GIS Support
23 June 1999

About 30 examples of land subsidence have been recorded. Most recently, two medical buildings were damaged in Wyandotte County in 1998-99, and previous activity in the county was in 1965-66, which damaged roads and destroyed houses as a result of subsidence over abandoned limestone mines. Russell County has active sinkholes along Route I-70 from oil well related collapse over 25 acres, which has already cost $1 million in repairs. Unfortunately, no other damage estimates are available for this hazard.[6] The following maps indicate areas of Kansas where wells and coal mines occur. Other mines in Kansas also include those for extracting salt, lead, zinc, and gypsum.

An extensive salt formation lies in central and south central Kansas, where near Hutchinson is 350 feet thick. Subsidence events were recorded in 1914 southwest of Hutchinson, in 1952 southeast of Hutchinson and there again in 1974. Another collapse occurred near Ellsworth in 1972. Those events related to salt mining have occurred on average of once every 17 years. Natural land subsidence from dissolution of salt occurs in Sumner, Sedgwick, Reno and McPherson Counties that, together, have a population of about 570,000 people.

Coal mines, and particularly abandoned mines, can be a cause of subsidence, and, in many locations in southeastern Kansas the location and extent of abandoned mine passages are not known. KDHE receives about 100 reports a year on coal mine subsidence. Overall, approximately 46,000 acres in 41 counties have been affected by coal mining in Kansas, including: a total of 1,142.3 acres of surface subsidence under towns and roads related to mining.

In addition, subsidence from abandoned lead-zinc mines is a problem in Cherokee County, and underground limestone mines have contributed to a subsidence problem in the Kansas City metropolitan area.

The most obvious impact of subsidence is not in loss of human life, but in the potential damage or destruction of buildings, roads and rails or infrastructure in Kansas. Over the years, several counties indicate repeated problems: Russell, Wyandotte, Reno, where Hutchinson is located, and Cherokee, in addition to those counties mentioned above. It is estimated that two to three mine collapses will occur every year and damaging sinkholes occur every year

Potential subsidence mitigation initiatives:

There are demonstrated approaches to mitigation of the vulnerabilities to subsidence, including reclamation of damaged lands. KDHE is currently operating a reclamation program, and 21.9 acres of mine-caused subsidence were reclaimed during 1997 to 1998. However, one of the principal methods to mitigation subsidence is to have adequate information regarding areas susceptible to this geologic hazard, if feasible, and to formulate restrictions on the type of development that can occur in such locations. In addition, if possible, avoiding construction or installation of critical infrastructure components, roads and pipelines, through such areas is

[6] Kansas Geological Survey

another non-structural mitigation technique. Additional potential mitigation initiatives for subsidence are given in this table:

MITIGATION INITIATIVES FOR SUBSIDENCE

Possible Program Mitigation Initiative **NON-STRUCTURAL INITIATIVES**	Higher Priority for KHMT consideration (✓)	Suitable for Local Program Initiative
Identify and map areas subject to subsidence	✓	
Catalogue and make available mitigation techniques that may be practical for Kansas locations		
Identify any critical facilities, utilities or roadways at heightened risk from damage		**Yes**
Develop codes, guidelines and requirements for construction in areas of risk from subsidence		**Y**
Conduct training/public education on subsidence		**Y**
Require purchaser disclosure of subsidence risk and mitigation techniques		
STRUCTURAL INITIATIVES		
Remove, relocate or reroute facilities, utilities and roadways away from areas at risk from subsidence	✓	**Y**
Back fill mines or reinforce the ground above the mine to minimize failure potential		

3.2.3 Landslides and Erosion

Landslides may occur when soil on hillsides is saturated following extended periods of rainfall or snow melt. Debris or landslide *floods* are created by the accumulation of debris, mud, rocks, and/or logs in a channel, which form a temporary dam.

In parts of the state where topographic relief is greatest, especially in central and eastern Kansas, landslides can occur when underlying shale's become saturated with water in wet years. Rocks and overlying soils then slip downslope and are a particular problem in areas of housing or where road construction has occurred. They can create large waves on lakes or reservoirs that can be deadly.

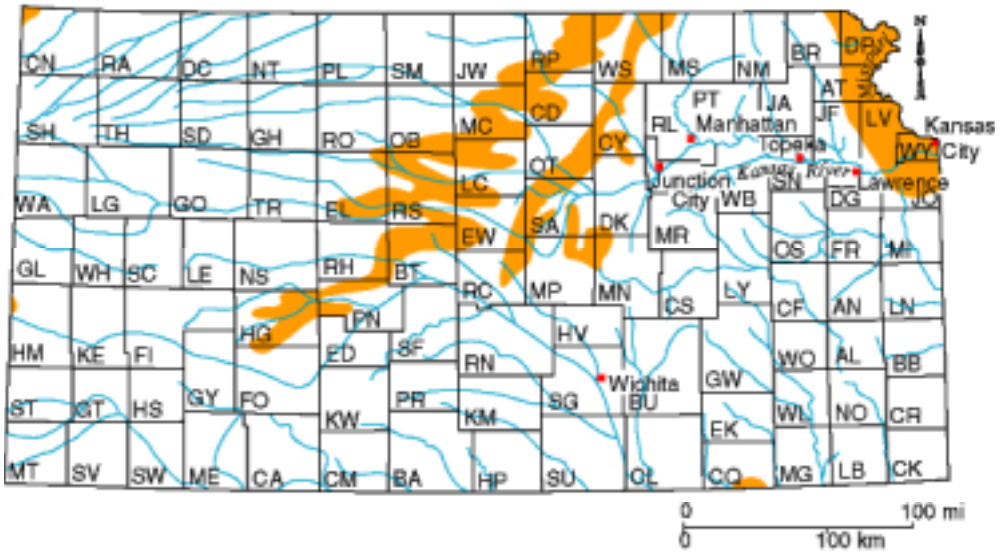
Two basic forces can cause erosion, or the loss of soil: wind and water. Stream bank erosion is a concern along reaches of several rivers in Kansas, especially downstream of large reservoirs in the Kansas and Nemaha rivers.

Landslides occur occasionally in Kansas and are a localized problem, but growth of cities provides potential for more property losses. Where more development has occurred, such as the Kansas City metro area, even with low to moderate incidence of activity, more structures will be damaged. In the US, landslides cause about $1.5 billion in damages. Those areas judged by the U.S. Geological Survey to be most prone to landslide are the Missouri River Corridor in northeast Kansas, including the Kansas City metropolitan area (Counties of Johnson, Leavenworth and Wyandotte); the Smoky Hills in northern and central Kansas, and northwestern Hamilton

County. The Cities of Lawrence (population, 70,000), Manhattan (40,000), and Topeka (123,000) are also landslide prone. This map illustrates the areas of the state relatively more vulnerable to the landslide hazard.

Northwest Marion County with 13,600 people has a moderate incidence, and northwest Hamilton County with 2400 people is highly susceptible to landslide.

Moderately susceptible counties which indicate a 1.5% to 15% chance of landsliding are Washington and Republic Counties to Hodgeman and Ford Counties where no cities exist; northeast Kansas, southern Chautauqua County and northwest Cheyenne County. Recently, Ellsworth, Russell and Ellis counties have had such incidents. It is estimated that one damaging landslide will occur every year in Kansas, more in wet years.



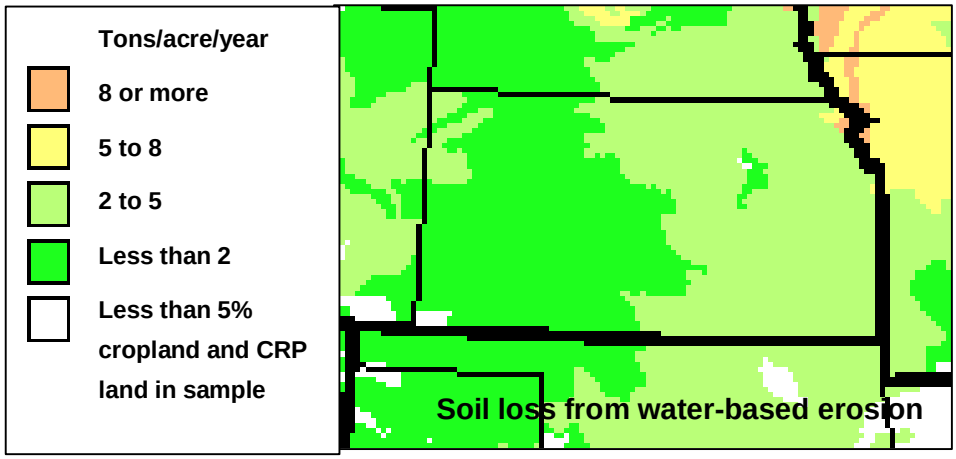
Landslide hazard areas of Kansas

Landslides cause more than 25 fatalities nationally on average each year and are often associated with other disaster events, e.g., earthquakes, flooding, heavy rainfall.

The most costly landslide damage in Kansas occurred to two houses destroyed and four lots damaged in Overland Park in 1995, estimated at $1.15 million. Other damages have been recorded, however: $120,000 to two houses in Leawood in 1990; $310,000 to a city park in 1994; another $880,000 to a road in Manhattan in 1995; $360,000 to a house in Stanley and $170,000 to a road and beach in Douglas County in 1998. Other instances reported were in Atchison in 1997 and in Kansas City, MO in 1999, with no damage estimates tabulated, as well as a few others at construction sites.

Erosion obviously has severe implications for agri-business, which is a vital part of Kansas' economy. Streambank erosion not only removes agricultural land, but also can damage or destroy transportation systems and utility lines. The phenomenon occurs annually, particularly in the spring and can occur along any streambank. For example, the Cimarron River in southwest Kansas has undergone channel widening.

Soil erosion is also associated with periods of drought, when winds are able to move tremendous quantities of exposed, dry soil. Kansas has a notorious history with soil erosion by wind as the state considered the center of the infamous "dust bowl" during the drought of the 1930's. As these photos indicate, blowing dust was a significant and frequent problem, not only causing the loss of valuable agricultural



soils, but causing health impacts from inhaled dust, causing safety hazards while driving, ruining equipment, the contents of homes, etc.

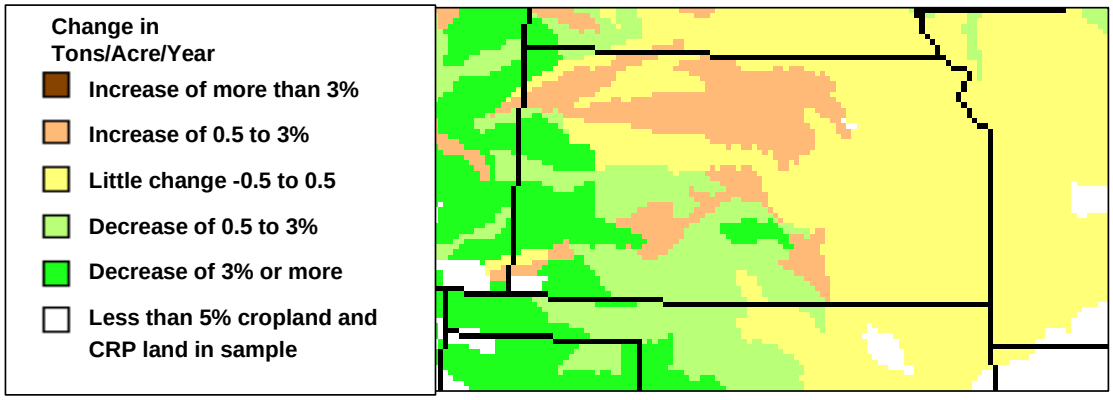
Changes in modern agricultural practices are considered to minimize the potential that the "dust bowl" days could return with as significant an impact. However, wind-caused soil erosion remains as a hazard for the State of Kansas, with the central

and north central part of the state the most vulnerable, as indicated on this map. For example, occasionally highways in western Kansas are closed due to low visibility caused by blowing dust. Given past drought events of the last century, four with wind erosion and one undocumented, this phenomenon would appear to occur an average of once in 20 years.

There is a range of mitigation initiatives that could be utilized to address the hazards of landslides and soil erosion. For landslides, many of the potential initiative rely on identifying the locations subject to this threat, so that both structural and non-structural initiatives can be targeted on the population and property at risk.

Potential mitigation initiatives for landslides and erosion:

Much of the water-caused erosion of concern to the KHMT is in locations beside or beneath the waterways in the state. For many communities, these are locations where facilities such as wastewater treatment plants are located, where pipelines and telecommunications cables are buried, etc. The erosion and scour that often accompanies flood makes these types of facilities and systems vulnerable.



Use of sound agricultural practices can be very helpful in minimizing loss of valuable soils through wind erosion.

Some potential mitigation techniques for landslide and erosion are given in the following table:

MITIGATION INITIATIVES FOR LANDSLIDES AND EROSION

Possible Program Mitigation Initiative **NON-STRUCTURAL INITIATIVES**	Higher Priority for KHMT considerations (✓)	Suitable for Local Program Initiative
Identify and map areas subject to landslides and stream bank erosion; make maps publicly accessible	✓	
Conduct engineering studies and determine mitigation techniques that may be useful to Kansas specific conditions;		
Develop/Implement criteria and plan for issuance of landslide warnings in areas of highest vulnerability		

MITIGATION INITIATIVES FOR LANDSLIDES AND EROSION (Con't)

Possible Program Mitigation Initiative **NON-STRUCTURAL INITIATIVES**	Higher Priority for KHMT considerations (✓)	Suitable for Local Program Initiative
Prepare plans for response and temporary control measures in areas of high vulnerability		**Yes**
Conduct training and public education on landslide response, control and mitigation		**Y**
Promulgate state codes or rules to restrict new construction in landslide or erosion prone areas and/or to require appropriate mitigation techniques		
Provide education and training to farmers and ranchers in the value of minimizing erosion and techniques for control of erosion		
Promulgate statewide codes or requirements for control of erosion in agriculture, construction, land development and landscaping	✓	
STRUCTURAL INITIATIVES		
Construct/install physical protection for critical facilities, utilities and transportation routes at risk of landslide or stream bank erosion.	✓	**Y**
Relocate structures, utilities and transportation routes away from areas vulnerable to landslide and/or stream bank erosion		**Y**
Retrofit or harden eroding waterway banks to protect utilities, structure foundations, bridges and roads		
Plant erosion and drought resistant vegetation in areas of high vulnerability and risk		

3.2.4 Expansive Soils

A relatively widespread geologic hazard for Kansas is the presence of soils that expand and shrink in relation to their water content. This change in soil volume can cause extensive damage to structure foundations, roadways, below grade utilities, etc. For Kansas, the vulnerability to this hazard most frequently is associated with soils shrinking during periods of drought.

This photograph indicates how this hazard can cause these types of damages:

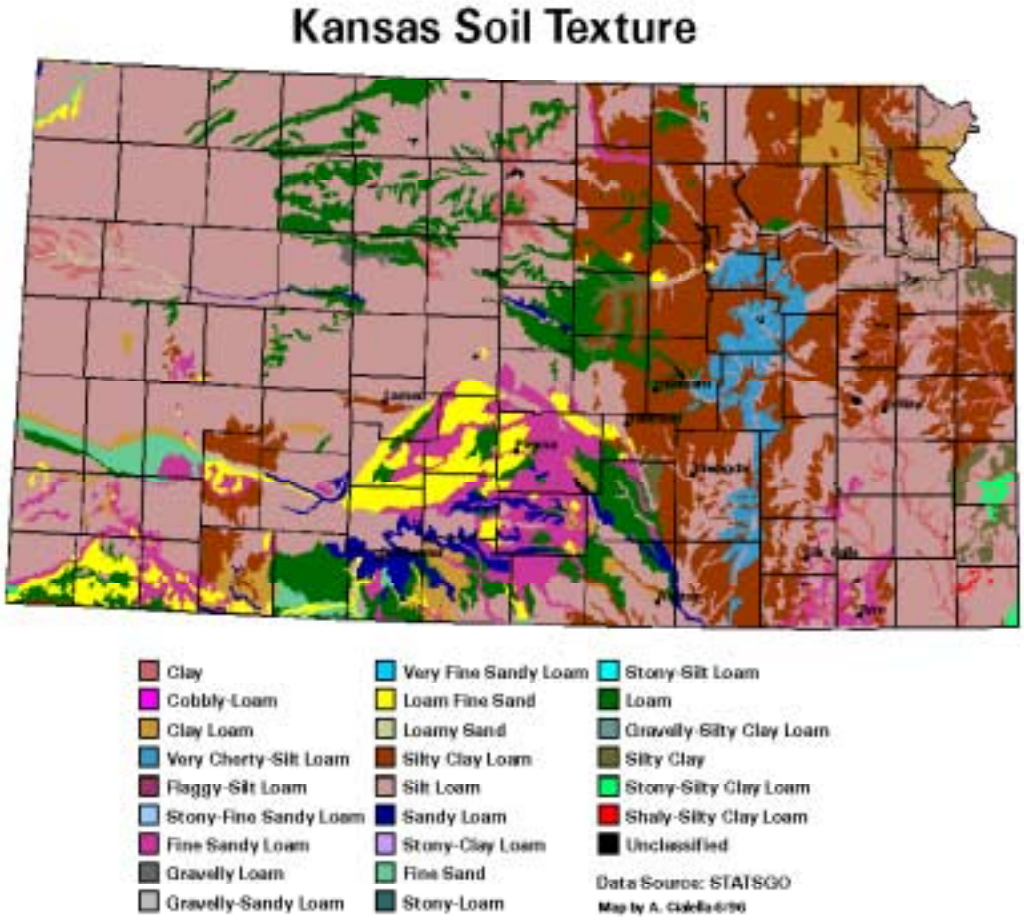
Volume changes in clay when water is added and removed

As the moisture content of clay based soils changes, increases or decreases in their volume can alter the pressures on foundations and buried utilities, causing damage.

Building settlements associated with drought have been noted in Kansas, for many years, particularly those located on higher ground, further from the water table. Many homes and buildings in the Kansas City metropolitan area experienced minor damage as a result of the 1952-53 drought. Up to 65% of the homes were damaged, at an estimated cost of $30-$40 million.[7]

Reports in 1985 indicated that movement in expansive shale's caused damage to St. Teresa's Academy, the 7th Church of Christ, Scientist; the Kansas City Public Library Country Club Plaza Branch, and the University Center at the University of Missouri, all in Kansas City, MO. In 1995 a house in Overland Park was damaged by center lift, which occurs when soils along the foundation shrink, lowering the outer walls, while soils in the middle stay wet.

Volume change of expansive soils subgrades resulting from moisture variations frequently cause severe pavement damage. Thirty-six states have expansive soils within their jurisdiction. Expansive soils are so extensive within parts of the United States that alteration of the highway routes to avoid the expansive soils is virtually impossible. The Midwest is particularly problematic for construction because of the varied mixture of clay soils.



[7] US Army Corps of Engineers data.

The interaction between expansive soils and vegetation is another factor that may cause damage to buildings. The phenomenon of accelerated soil shrinkage due to transpiration by trees can result in the formation of desiccation structures in pavement.

Streets and parking lots throughout the state are damaged every year by the effects of expansive soils. It is a problem that is ongoing until damaged is recognized, sometimes spectacularly. It is difficult to predict where or when the next occurrence will be; however, eastern Kansas and the Kansas City metro area, given past experience and the soil conditions are potential sites. The distribution of clay soils is an indication of the extent of the vulnerability to this hazard in the state: Developed and developing communities in Kansas in the areas of high clay content soils, and that commonly experience fluctuations in the water table, are probably the most vulnerable to this geologic hazard. Specific information to more precisely detail the structures at risk is not available on a statewide basis and would necessitate community specific investigations. However, the size of the problem can be illustrated by the fact that each year in the United States, expansive soils cause billions of dollars in damage to buildings, roads, pipelines, and other structures. This is more damage than that caused by floods, hurricanes, tornadoes, and earthquakes combined. It is estimated that approximately 10% of the homes built on expansive soils experience significant damage.

Potential expansive soils mitigation initiatives:

Many of the mitigation techniques available for reducing the vulnerability to this hazard relate to either avoiding areas of known expansive soils for construction of building foundations, roadways, or buried pipelines. However, such avoidance is not feasible for many locations in Kansas. When applicable, specialized construction techniques can help to minimize future damages. Other possible techniques are provided in this table:

MITIGATION INITIATIVES FOR EXPANSIVE SOILS

Possible Program Mitigation Initiative **NON-STRUCTURAL INITIATIVES**	Higher Priority for KHMT consideration (✓)	Suitable for Local Program Initiative
Identify and map areas subject to expansive soils; Make information publicly available	✓	
Catalogue and make available mitigation techniques that may be practical for Kansas locations		
Identify any critical facilities, utilities or roadways at heightened risk from damage	✓	
Develop codes, guidelines and requirements for construction in areas of risk from expansive soils		
Conduct training/public education for architects and contractors on expansive soils design and construction techniques		**Yes**
Require purchaser disclosure of expansive soils risk and mitigation techniques		

MITIGATION INITIATIVES FOR EXPANSIVE SOILS (Con't)

Possible Program Mitigation Initiative **STRUCTURAL INITIATIVES**	Higher Priority for KHMT consideration (✓)	Suitable for Local Program Initiative
Retrofit critical facilities to minimize expansive soils damage		**Y**
Remove, relocate or reroute facilities, utilities and roadways away from expansive soils areas		**Y**

3.3 The Vulnerability to Natural Hazards – Hydrologic Hazards

Hydrological hazards are those that result from unusual fluctuations beyond normal rainfall conditions, and the hydrologic hazards of concern to the KHMT are flooding, drought, and drought-associated wildfire. The vulnerability of the State of Kansas to these hazards is summarized in this section.

3.3.1 Flooding

Floods have been the leading natural disaster in the US during the 20th Century, representing 40 per cent of all natural disasters in terms of number of lives lost and property damage. Most deaths occur when people are swept away in currents, while property damage occurs primarily from inundation by sediment-laden water. The power of flood currents can demolish buildings, and erosion can undermine bridge foundations, collapsing structures.

Floods, while generally caused by the accumulation of too much water in too little time in too small an area, can be divided by type such as regional, flash, ice-jam, storm-surge, dam and levee failure floods, as well as debris, landslide and mud-flows. Warning time can be from a few seconds to months, and the duration can last from hours to weeks -- or even months in the case of the 1993 flood.

Kansas also is prone to flash flooding, which may be defined as a rapid rise in water level, fast-moving water and debris. This is an increasingly serious problem due to removal of vegetation, paving and replacement of ground cover by impermeable surfaces that increase runoff, and construction of drainage systems that increase runoff speed.[8]

Riverine flooding, rather than lake flooding, is the most common type of flood hazard in Kansas. In this case, when a stream channel fills with more water than it can carry, water rises and flows over the banks onto the adjacent floodplain.[9] A stream will typically overflow two years out of three, unless drought conditions prevail.[10] Flooding can occur upstream as water becomes stored behind the temporary dams of debris and then becomes a flash flood as the debris dam is breached and rapidly washes away.

[8] Kansas Hazard Mitigation Plan, Oct.,, 1999, p. 33
[9] Kansas Hazard Mitigation Plan, Oct., 1999, p. 32
[10] http://disastercenter.com/kansas

Kansas had had about 150 destructive floods on its major rivers between 1844 and 1954.[11] Until that date, the worst had been in 1903 and 1951. The latter's damages were reported to be $767 million, 42 percent of which was attributed to the loss of business income outside the flooded area, emergency aid and relief. Urban damages accounted for 39 percent and rural losses at 19 percent of that figure.

Persistent wet meteorological patterns are usually responsible for very large regional floods such as the Mississippi River Basin flood of 1993 wherein about 40 inches of rain fell during the first seven months of the year in northeast Kansas. The Great Flood of 1993 affected nine states to the degree that they were eligible for assistance from FEMA, including Kansas' designation as of July 22.

Runoff resulted in further flooding throughout the lower Missouri River basin in central and east Kansas. This most devastating flood in US history, (considered to be a once in 100-500 year event) that put million of acres of farmland under water for weeks, damaged roads, and made the rivers unnavigable. Waters over topped or destroyed numerous levees and eroded valuable topsoil. Fifty-one counties were declared disaster areas in Kansas, or 49% of the total number of counties in the state.

Kansas again received major declarations in October and November of 1998 for flash flooding from severe storms caused by record rains that resulted in many rivers overflowing their banks. These included the Arkansas, Little Arkansas, Whitewater, Ninnescah and Walnut in 1998. The counties of Butler, Cowley, Sedgewick, Bourbon, Leavenworth, Jackson, Linn, and Wabaunsee were included in President Clinton's disaster declaration of October 14. Johnson, Leavenworth, Marion, and Wyandotte Counties were also added to this declaration. In Seward County, up to nine inches of rain fell in two days causing flooding in areas with poor drainage.

In July, 1951, excessive rain caused serious flooding in the Kansas and Neosho River Basins. Flooding on the Kansas River and the downstream Missouri River occurred following an average rainfall of 6.4 inches in May, 9.6 in June and a stretch of four days in mid-July of as much as 18.5 inches over the Osage-Marais des Cygnes River and Kansas Rivers. Precipitation totals and patterns were similar for 1951 and 1993 and total flood volumes were similar, but the timing of the flood discharges from the tributaries was different producing an estimated uncontrolled flood discharge in 1993 that was about 50 percent of that of 1951.[12]

The Kansas River flooded three times in the 20th Century. Turkey Creek in Johnson and Wyandotte Counties has flooded seven times in 25 years damaging homes and businesses.[13]

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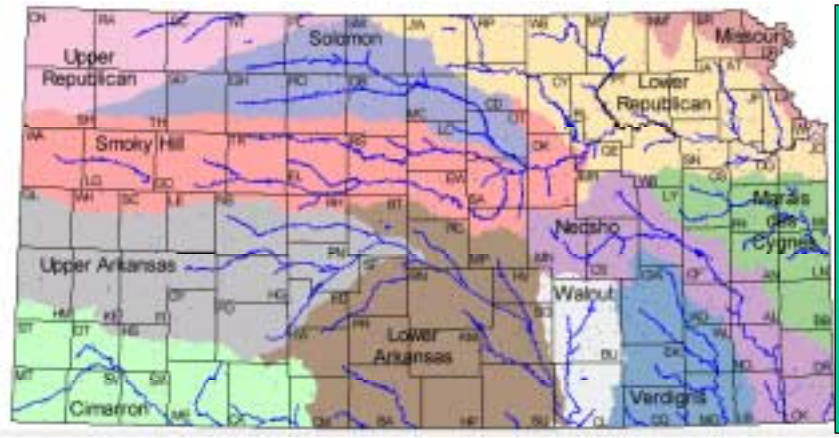
[11] Water in Kansas 1955, A Report to the Kansas State Legislature, July 26, 1954
[12] Effects of Reservoirs on Flood Discharges in the Kansas and the Missouri River Basins, 1993, Charles A. Perry, U.S. Geological Survey Circular 1120-E, p. 19.
[13] KGS, Need for a Geologic Hazards Program in Kansas, by Gregory C. Ohlmacher, October 2000, p.6.

The vulnerability of Kansas to flooding is significant. Ten of the state's twelve river basins are designated by the Kansas State Water Plan as "priority" for flood loss reduction, as indicated here:

Kansas can probably expect one damaging flood every year, in any floodplain in the state. It is estimated that a $10 million flood has occurred every other year. Buildings and infrastructure components located in floodplains and poorly drained areas throughout the state are vulnerable to this hazard. The Water Resources Division of the Kansas Department of Agriculture maintains a database of structures within the floodplains of the state.

The health and safety impacts of flooding can be devastating, as illustrated by the following:

- Floods were the top natural disaster in the US in the 20th Century, representing 40% of the total. The annual number of fatalities nationally from flooding is 94.
- Flooding in the Kansas, Missouri, Verdigris, Arkansas and Neosho River Basins to flood in July, 1951, caused 15 deaths
- In 1993 the floods caused a total of 47 deaths in nine states, including two in Kansas
- In the Kansas City area, two persons died, while on the Lower Arkansas River, one person died in 1998 flooding
- Most deaths occur when people are swept away in flash flood currents, half of which are vehicle-related, when people attempt to drive through floodwaters covering roadways.
- In earlier flooding, 10 deaths occurred in 1935 on the Republican and Upper Kansas rivers; three in 1965 on the Arkansas River, and one in 1976 on the Verdigris River.
- Continuing land development in certain areas Kansas could place more people and property in flood prone areas



Basins with "priority watersheds for flood damage reduction"

- ✓ Lower Arkansas
- ✓ Upper Arkansas
- ✓ Kansas-Lower Republic
- ✓ Marais des Cygnes
- ✓ Missouri
- ✓ Neosho
- ✓ Smokey Hill-Saline
- ✓ Solomon
- ✓ Verdigris
- ✓ Walnut

The economic vulnerability of Kansas to the impacts of flooding due to crop losses and property damage is also substantial, as illustrated by the following:

- A high percentage of crop acres in Kansas City District floodplain areas suffered losses due to overtopping of nine of 15 units in the federally-constructed Missouri River Levee System and virtually all the non-federal farm levees in the district during the 1993 Great Flood. More than 1.4 million crop acres were classified as failed resulting in damages totaling $359 million.[14] Cropland damaged by sand and scour for just the Missouri portion of the Missouri River was estimated at 455,000 acres with an estimated $500 million to reclaim sand-damaged land.[15]
- Damages to property were estimated at $15 to $20 billion for the 1993 flood event that covered eight other states besides Kansas
- Damages to cities and small towns in 1993 were estimated at $661 million and to the public sector (infrastructure), $274 million. The total cost of repairing Federal levees was estimated at $41.9 million and non-federal levees at $300 million. (However, damage prevented by Kansas District reservoirs was estimated at $4 billion, and local protection levees including those at Kansas City and Topeka prevented an estimated $4.7 billion.[16])
- In the Kansas City area $13 million in damages occurred, while on the Lower Arkansas River, damages were estimated at $55 million in the 1998 flood
- *Flooding in northeast Kansas in 1999 caused about $2 million in damages, but no deaths*
- Damages in the 1951 were estimated at $800 million
- Total flood damage estimate for 16 flood events between 1951 and 1999 is between $1.7 and $2 billion

Kansas' valuable environmental and cultural resources are not immune to the impact of flooding either. Prolonged flood conditions such as the 1993 event caused the loss of wildlife, the contamination of recreational areas, vegetation to be swept away, and the ground to be saturated for many months.

The extent of the vulnerability of Kansas to flooding places additional emphasis on participation in FEMA's National Flood Insurance Program (NFIP). According to NFIP information, there are currently 104 Kansas' communities that have flood hazard areas that are not NFIP participants. Most homeowners' insurance policies nationwide do not cover floodwater insurance. But more than half the communities in Kansas have floodprone areas, according to NFIP designations. To date, only 55 of 105 counties have had their flood plains mapped by FEMA, and of those counties with flood plain maps completed, eight are not NFIP participants, and two others, Wyandotte and Mitchell, have been suspended from the program. However, as of the October and November 1998, floods in Kansas, 314 communities were NFIP participants.

Other important facts regarding NFIP participation illustrate the need for additional efforts in promoting the NFIP program across the state include the following:

[14] The Great Flood of 1993 Post-Flood Report, US Army Corps of Engineers, Sept., 1994, p.48
[15] Soil Conservation Service, 1993
[16] Ibid., p. 49

- Kansas has had 4,171 NFIP flood losses between 1978 and 1998,
- Total NFIP flood damage payments are in excess of $31 million, with average annual payments of $1.5 million,
- Kansas ranks 23rd in NFIP flood losses nationally,
- A mitigation "purchase and removal" program of 75 properties in Manhattan following the 1993 Flood took about five years and $12 million to complete.

Potential flood mitigation initiatives:

It is clear from this analysis that a major flood mitigation initiative that would be valuable for Kansas is to more actively pursue implementation of the NFIP program in the state. If possible, this effort would encompass:

- Completing up-to-date Flood Insurance Rate Maps for areas in need,
- Encouraging additional communities and counties to participate in the program,
- Getting more communities to strive to improve their community rating through active participation in the Community Rating System,
- Soliciting additional home and business owners to purchase insurance, and
- Providing additional training in NFIP program implementation and benefits,
- Continuing to purchase and remove vulnerable properties from the flood plain.

Tasks to be implemented by KHMT participating agencies to address the state's flood vulnerability have been incorporated into the annual management plan that is included in this strategy.

Additional flood mitigation initiatives that could be considered are listed in the following table:

MITIGATION INITIATIVES FOR FLOOD

Possible Program Mitigation Initiative **NON-STRUCTURAL INITIATIVES**	Higher Priority for KHMT consideration (✓)	Suitable for Local Program Initiative
Insure government facilities/contents through NFIP, where appropriate.		**Yes**
Conduct engineering studies on government facilities for flood hazard vulnerability		**Y**
Develop plans for flood damage control		**Y**
Train personnel in flood mitigation/plans/procedures	✓	**Y**
Promote public education and training programs in flood hazard awareness and flood mitigation techniques		**Y**
Develop incentives (taxes, insurance, etc.) for flood mitigation activities by the general public and private sector		
Change building codes to require flood risk area avoidance and mitigation techniques		
Prioritize and complete flood plain and flood prone area mapping; Update out-of-date maps	✓	**Y**
Develop and implement programs for greater participation in the National Flood Insurance Program and the Community Rating System	✓	**Y**

MITIGATION INITIATIVES FOR FLOOD (Con't)

Possible Program Mitigation Initiative **NON-STRUCTURAL INITIATIVES**	Higher Priority for KHMT consideration (✓)	Suitable for Local Program Initiative
Gather and utilize data on flood hazard areas, repetitive loss structures, critical facilities at risk from flooding, etc.		**Y**
STRUCTURAL INITIATIVES		
Continue/expand purchase and removal of structures at risk from flooding including mobile homes and mobile home parks	**X**	**Y**
Retrofit/flood proof state and local government critical facilities		**Y**
Design, construct and/or improve storm water control systems where needed		**Y**
Retrofit and/or protect critical utilities and infrastructure components from failure or damage during flooding		**Y**
Install flood monitoring and warning equipment in areas of high risk or frequent flooding		**Y**
Relocate unsuitable uses (e.g., oil tank farms, sewage treatment facilities) out of the flood plain or retrofit to prevent flood damage and release of dangerous materials during floods		**Y**
Relocate, remove or flood proof vulnerable agricultural facilities (e.g., animal waste lagoons) now located in flood plain		**Y**

In addition to these considerations, some "mitigation lessons learned" from the 1993 flood warrant recognition, particularly regarding levees as a flood mitigation technique. According to the US Army Corps of Engineers report, agencies responsible for floodwalls and levees should be periodically reminded about maintaining a clear zone along these structures to allow for inspection and to prevent roots from forming channels, including tree removal; better aerial photography of the region should be prepared; a how-to sandbagging video be produced for organizations; consideration of a single, integrated electronic data-storage system such as a resource GIS data base, and better coordination with weather forecasting, among others. [17]

It is also noted that the damage and destruction to infrastructure will require mitigation considerations in rebuilding, as will damage to communities and potential relocation. In addition, it might not have been possible to restore land to it former agricultural use. It was written at that time, that federal floodplain management policy is being reassessed as well.[17]

In this area, currently certain levees are under review to determine if they would still be effective for flood protection for the design basis event. If not, these levees could be "decertified" rendering the development within the areas protected theoretically vulnerable to flooding. If and where this circumstance arises, affected

[17] The Great Flood of 1993 Post-Flood Report, US Army Corps of Engineers, Sept. 1994. P. 55
[17] ibid., p. 59

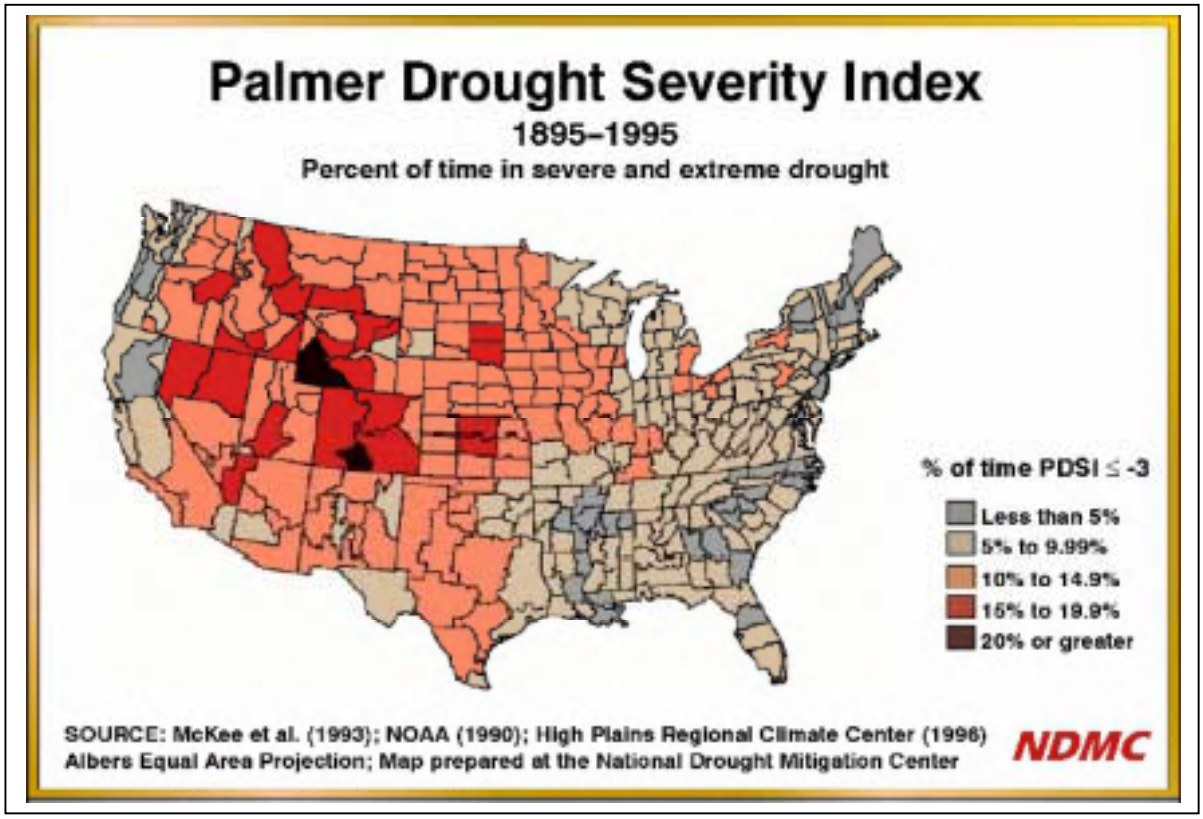
communities would need to be actively solicited for participation in the NFIP program as well as part of the KHMT's flood mitigation efforts.

3.3.2 Drought

Drought is generally defined as a condition of moisture levels significantly below normal for an extended period of time over a large area that adversely affects plants, animal life and humans. It can also be defined in terms of meteorology, agriculture and hydrology. While drought can often be predicted a year ahead, sometimes there is little warning. While the duration of a drought can be months, years, or even decades, each year some part of the country has a severe drought. It is rarely a direct cause of death, though the associated heat waves, dust and stress can all contribute to increased mortality.

During the past 100 years, five major and numerous minor drought episodes have impacted Kansas. In more recent decades, the drought of record between 1952 and 1957 was considered a 2% chance drought, and the odds of it repeating are 50 to 1. More recent droughts have occurred in 1988, 1989 and 1991. [18] In recent years, in 1999 and 2000, Kansas has also suffered drought conditions.

When considering the secondary effect of wind erosion as a result of droughts, the worst occurred in 1890-94, 1910-14, 1937-37, 1952-53 and 1975-76. It is estimated



[18] http://www.kwo.org/drought/main.html

that 21.5 million acres were lost in the Great Dust bowl and 891,000 acres in the '70's.[19] The droughts of the 1930's and 1980's were the most damaging. Photographs demonstrating the extraordinary dust conditions during the drought of the 1930's are provided above.

Drought losses suffered just in the period 1936-1939 and 1953-1954 were equivalent to an average annual loss of $75 million over the span of years from 1936 to 1954 in 1951 dollars. Aggregate losses in crop production due to insufficient soil moisture when it is needed by the plants far exceed the total losses due to floods.[20]

A 1954 report indicates that 1952 was the driest year since 1887 with the exception of 1936, but the effects began to be in a drop in crop production of 39 percent in the 1953 harvest. This translated into a 20 percent decline in crop receipts, or $100 million at the time. In 1954, 41 counties were declared eligible for aid under the Emergency Feed program. During this period, 175 cities reported water shortages, with most restricting was use. After droughts, grazing lands can require several years of normal rainfall to recover, and remaining vegetation can be susceptible to wind erosion.

This national map of long-term drought trends indicates that major areas of Kansas, particularly in the central sections of the state, are very vulnerable to drought.

Using the Palmer Drought Index, as indicated on the map, shows that, over the long term, most of Kansas has been in severe or extreme drought conditions 10-14.9% of the time, and the central portion of the state experiencing severe or extreme drought 15-19.9% of the time.

Currently, the northern quarter of Kansas cut diagonally across the state has been labeled as a drought area by the US Drought Monitor. The rest is considered a "drought watch" area, while a small portion of the southeast corner of the state is labeled as recovering from drought.

While drought is a recurrent feature of the climate of Kansas, there is currently no area of Kansas that is considered a "declared" drought area at this time. However, approximately one-third of the state could be considered a drought area.[21] These recent drought conditions are indicated by the figure given on the next page.

As indicated by past disasters, communities throughout the state must be considered vulnerable to past disasters. Much of this vulnerability rests with the ability of communities, businesses and agricultural enterprises to continue to obtain adequate water throughout the event for their purposes.

While the vulnerability to drought for Kansas is typically for the economic vitality of the state, or for its valuable environmental resources, drought can cause health and safety impacts, as illustrated by the following:

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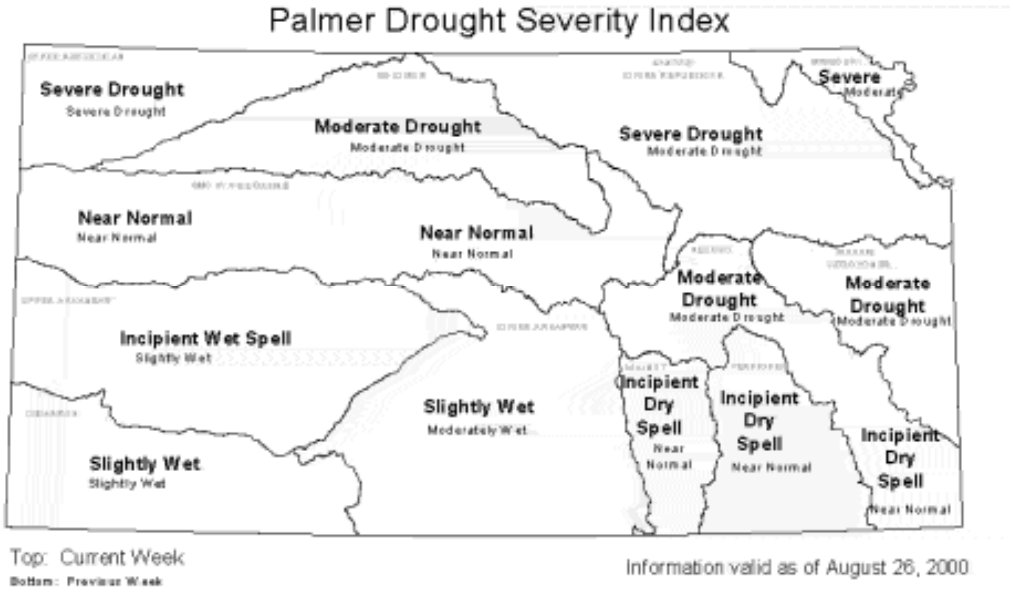
[19] Kansas Geological Survey
[20] Water in Kansas 1955, A report to the Kansas State Legislature, July 26, 1954
[21] http://enso.unl.edu/ndmc/impacts/us/usimpact.html



- Deaths occur during drought periods are usually related to extreme heat
- Thousands of deaths occurred regionally during the 1888 droughts
- Health and safety impacts of the 1930's drought are unknown, but they are thought to exceed that of 1988 drought. There are reports of respiratory illness from dust as well as heat.
- Drought normally increases the potential for wildfire, which could result in health and safety impacts from the flames or smoke.

The impact to the economic vitality of the state can be shown by the following facts:

- Annual drought losses nationally are estimated at $ 6 to 8 billion, which far exceeds the annual national losses from hurricanes or floods,
- On an annual average, 18% of the United States is impacted by drought at any one time,
- Some part of the Missouri River basin has experienced drought in 90 of the last 100 years,
- Data are lacking for the 1930's drought, but the 1988-89 drought damage was estimated at $40 billion nationally. The 1930's drought could have exceeded this damage level if accurate records were available.

Many of Kansas valuable natural environmental systems are based on the adequacy of surface water flows and ground water levels. Drought adversely impacts these of course and natural ecosystems can be severely impacted by the lack of water or a decrease in its quality because of increased concentrations of pollutants. In addition, drought could impact the quality of Kansas' water-based recreation opportunities, due to lowered surface water levels.

Potential drought mitigation initiatives:

Principal drought mitigation initiatives will address primarily the economic impacts of this hazard on Kansas. An important mitigation initiate is the state's drought mitigation plan, under which state resources are mobilized to address the event's impacts.

The Kansas Water Authority (KWO) set the "triggers" used by the Kansas Water Office to determine when to advise the Governor that the state's Drought Response Team should be activated. These triggers are based on the Palmer Drought Severity Index that indicates long-term abnormal moisture deficiency or surplus. When the index drops below a –2.5 (moderate drought) in a region for four consecutive weeks or -3 (severe drought) in a region for a week, the KWO will advise the Governor and recommend the assembly of the Drought Response Team. The team is then able to coordinate the mobilization of personnel, economic, technical and equipment resources to attempt to mitigate the impact of the event on the state's communities and businesses.

Another key drought mitigation activity is the efforts by the KWO to assure the adequacy of water supplies and stream flows during drought periods. Much of this effort comes through the KWO's efforts to:

- More effectively use water storage space in Federal reservoirs by securing it for community use,
- Advising and supporting communities in the development of more adequate water supplies and service systems,
- Working with watershed organizations to coordinate development of water resources on a local and regional level, and
- Encouraging the regionalization of water systems to make the participating communities more drought resistant due the improved capacity and delivery capabilities beyond that available for a single community.

Other potential drought mitigation initiatives that can be considered are given in the following table:

MITIGATION INITIATIVES FOR DROUGHT

Possible Program Mitigation Initiative **NON-STRUCTURAL INITIATIVES**	Higher Priority for KHMT consideration (✓)	Suitable for Local Program Initiative
Identify and map areas with higher economic or health vulnerability to drought conditions		**Yes**
Educate the public on drought mitigation and water saving techniques		**Y**
Develop local response and recovery plans for drought incidents		**Y**
Monitor drought conditions and increase public awareness programs when drought threatens		
Develop statewide codes and regulations for water conserving construction in residential buildings		
Develop statewide codes and regulations for water conserving operations in agriculture and industry		
Develop and implement local inspection programs in water usage/waste		**Y**

MITIGATION INITIATIVES FOR DROUGHT (Con't)

Possible Program Mitigation Initiative **NON-STRUCTURAL INITIATIVES**	Higher Priority for KHMT consideration (✓)	Suitable for Local Program Initiative
Identify and define underused water sources and make known in drought prone areas	✓	
Identify underused water storage capacity in existing reservoirs	✓	
Develop financial incentive program (revise existing financial incentives) for growing low irrigation crops		
Develop and deliver educational programs in the merits of low irrigation crops	✓	**Y**
Research, develop and implement statewide programs and incentives for use of recycled water.		
Develop state program/promote drought insurance for farmers		
STRUCTURAL INITIATIVES		
Retrofit "leaky" or "wasteful" community water systems		**Y**
Build new water storage reservoirs and/or expand existing reservoirs		**Y**
Construct pipelines to access existing state and federal water storage capabilities	✓	
Construct community water system interconnections		**Y**
Construct expanded water storage facilities within existing community water systems		**Y**
Construct and promote "pilot" water recycling operations		**Y**
Install groundwater level monitoring devices for warning of temporary depletion		**Y**

3.3.3 Wildfire

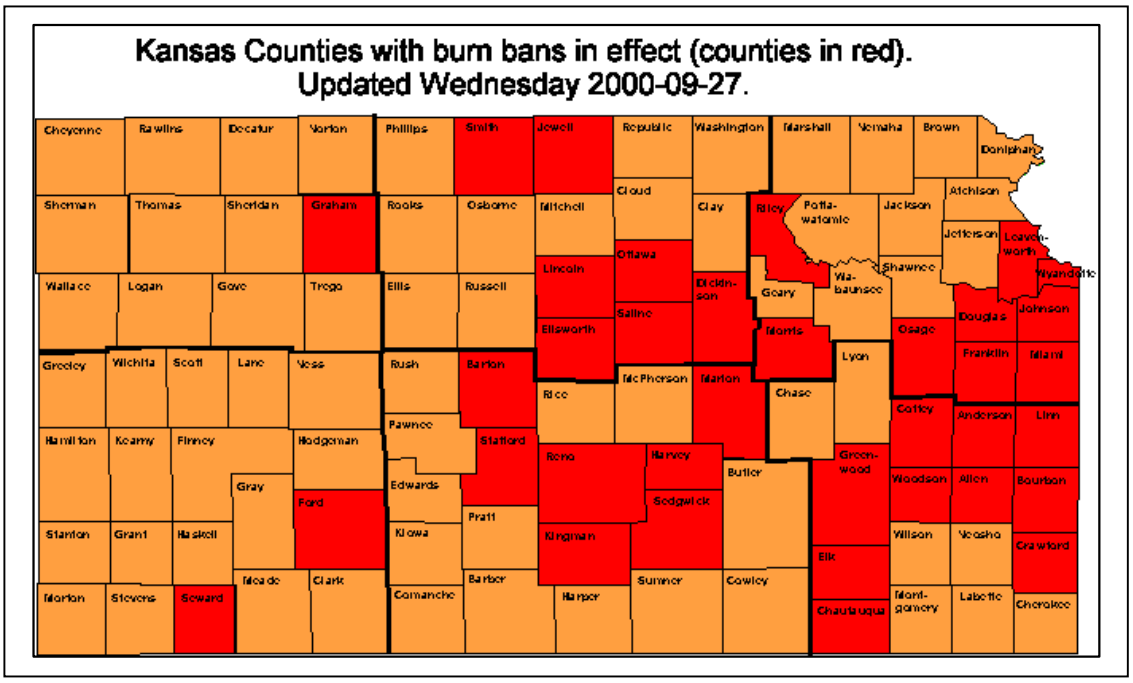
Wildfires in Kansas are closely linked to other natural hazards such as drought and lightning strikes. Although only about 5% of the land is forested, dry vegetation on pastureland and agricultural fields can serve as ready source of fuel.

A commonly reported cause of wildfires in Kansas is the practice of ranchers or farmers "burning fields" in order to replenish the nutrient content of the soil or alter the existing vegetation growth. These types of fires, in many counties, are neither permitted nor monitored, and it is not unusual for such fires to spread beyond their intended area, resulting in a wildfire.

For the last 14 years in Kansas for which records have been kept, debris burning and "miscellaneous" have been the major causes of the average number of fires and acres burned.

In 2000, the western United States was experiencing increased wildfires, and many areas were severely affected. In Kansas, the wildfire hazard also increased significantly.

The use of burn bans is a temporary, but potentially effective, wildfire mitigation technique during periods of heightened risk from this hazard. Recent experience with wildfires during the 2000 season can be seen from the number of burn bans in effect during the same time period, indicated by this map. However, as indicated on the burn ban map, its use can be uneven across areas of risk, and improvements in the approach to and coordination of local burn bans may be an effective mitigation technique for the KHMT to consider.



In reviewing the vulnerability of Kansas to wildfire, facts regarding from the seventeen Western states show how Kansas ranks in on a relative scale in managing this hazard, for Kansas is: [23]

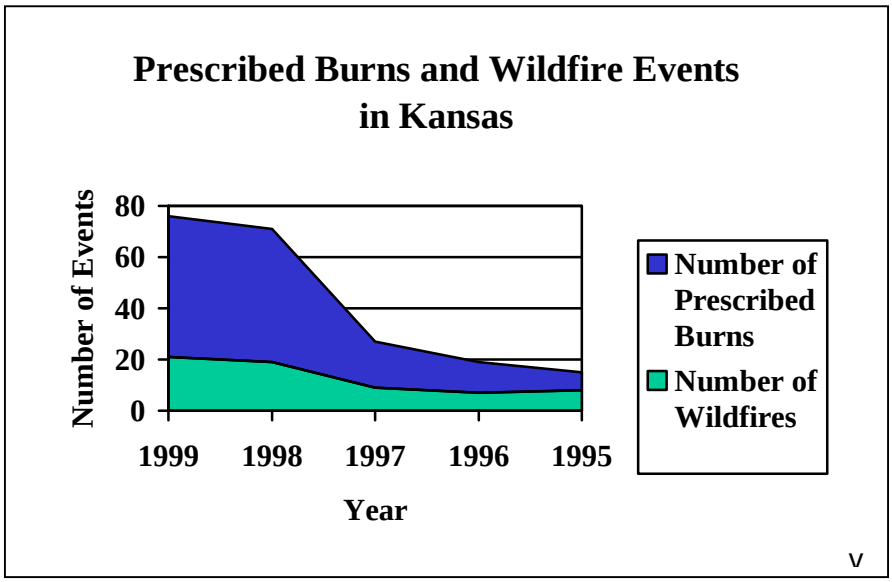
- Fifth in total acres in area protected by the state, at 46,400,000 (through coordination w/ rural fire departments)
- Second in number of local fire departments with 673
- Fifteenth in average size of fire at 1.483 acres and tenth in average size of fires over 10 acres, at 759 acres
- Second in 5-year average number of fires at 4384 per year
- Second in 5-year average number of acres burned at 190,638
- *Last* of the 17 Western states in fire program funding levels, with $305,482, none of which is state funding.

From 1985 to 1994, wildfires destroyed more than 9,000 homes and other insured properties in the US according to the Insurance Services Office, Inc. However, there are few data to describe the safety, property and economic risks of wildfire in

[23] "Fire in the West—A Report to the Council of Western State Foresters", Sept., 1999

Kansas. Similarly, it is difficult to gauge the risk factors for people and structures in the urban interface: but some factors to consider are lack of "firewise" landscaping, narrow access to structures, and inadequate water supplies.

The state carries out prescribed burns and the number of acres treated under various prescribed fire programs ranks third of the 17 Western states with an average of 13,436 acres annually, based on data from 1994 - 1998. Seventy-five percent of fires under 10 acres are controlled, ranking Kansas last of these states. The chart below shows the relationship between prescribed burns and wildfires on federal lands in the state:



The risk of wildfire varies with each season, and with locations within the state. However, due to the primarily rural, agricultural characteristics of the state, most if not all of Kansas' counties must be considered as vulnerable to wildfire. Of course, structures and infrastructure components located in isolated areas or within the "urban interface" are most vulnerable on a local level. The "urban interface" is in the suburbs of growing communities, where development occurs within or immediately adjacent to wildlands. The urban interface is actually a very localized phenomenon, and, like most states, Kansas has not been able to accurately identify such locations on a statewide basis.

Potential Wildfire Mitigation Techniques

The U.S. Fire Administration is charged with responsibility to involve public and private sector to reduce losses through public education, arson detection and control, technology and research, fire data collection and analysis and fire service training and education. Additional efforts are needed; however, to assist local communities and jurisdictions in developing standards and model codes that addresses the issues of defensible space, construction materials, vegetation management, adequate water supplies, and evacuation planning. [24] The KHMT considers mitigation

[24] Kansas Hazard Mitigation Plan, Oct. 1999, p. 41.

initiatives an important part of its overall program to make Kansas a disaster resistant state.

Additional wildfire mitigation initiatives are provided on the following table:

MITIGATION INITIATIVES FOR WILDFIRE

Possible Program Mitigation Initiative **NON-STRUCTURAL INITIATIVES**	Higher Priority Consideration for KHMT consideration (✓)	Suitable for Local Program Initiative
Pass legislation to enhance and/or require fire protection equipment purchase and availability in wildfire prone areas	✓	
Identify and map wildfire prone areas and the "urban interface"		
Conduct public education/training in wildfire mitigation		
Evaluate government owned facilities' vulnerability to wildfire; Plan corrective action		**Yes**
Develop emergency plans/procedures for personnel stationed in facilities vulnerable to wildfire		**Y**
Develop and implement statewide program to encourage or facilitate controlled burns of wildfire prone areas	✓	
Develop and implement program to ensure controlled burns on state owned lands and rights-of-way		
Develop statewide codes providing for control and enforcement of private agricultural use of controlled burns		
Develop codes and ordinances requiring "fire wise" land development and building construction in the urban interface	✓	**Y**
Change existing agricultural subsidy and land controls to facilitate more effective use and safer use of controlled burns		
Develop intra- and interstate mutual aid agreements and operating protocols to improve wildfire response		
Develop a statewide program for common criteria and coordination of "burn bans" at the time of heightened risk	✓	**Y**
STRUCTURAL INITIATIVES		
Purchase and distribute additional wildfire suppression equipment and materials		**Y**
Conduct additional controlled burns and/or vegetation removal programs		**Y**
Construct additional water supply sources in areas prone to wildfire		**Y**
Remove or retrofit structures in vulnerable areas		**Y**
Equip additional statewide teams to achieve more rapid wildfire response		
Equip state agencies with wildfire monitoring equipment, e.g., aircraft, remote cameras, etc.		
Construct access roadways in wildland areas posing additional vulnerability to developed lands, utilities and communities		**Y**

3.4 The Vulnerability to Technological Hazards

This section will include potential hazards of dam and levee failure, power/infrastructure failure, water contamination, and hazardous materials.

It is recognized that frequently technological disasters may occur as a result of natural hazard events. Dam and power failure may occur after severe storms and flooding; power failure frequently occurs during tornado events; water quality may be compromised as a result of flooding; hazardous materials may accidentally be released if structures housing them are destroyed, as well as buildings being burned as a secondary effect. Often, this simultaneous or "cause-and-effect" occurrence between natural and technological hazards can significantly increase the impacts of disaster events. In comparison, technological emergencies or disaster can occur separately as well. The vulnerabilities of the communities of Kansas need to be viewed in this context: vulnerability to combined natural and technological hazards, and to technological hazards occurring separately.

3.4.1 Dam and Levee Failure

Levees are built for solely for flood protection, while dams may have several purposes; frequently flood control is one of the principal reasons. Dams and levees usually are engineered to withstand a flood with a computed risk of occurrence. For example, a dam or levee may be designed to contain a flood at a location on a stream that has a certain probability of occurring in any one year. If a larger flood occurs, then that structure will be overtopped. If during the overtopping the dam or levee fails or is washed out, the water behind it is released to become a flash flood. Failed dams or levees can create floods that are catastrophic to life and property because of the tremendous energy of the released water impacting areas behind the levee or downstream of the dam.

Kansas is second in the nation for the number of dams, with about 150 older dams and about 400 dams designated as "high hazard" dams due to the level of development in the downstream inundation areas. High hazard dams are to have plans prepared and maintained for emergency response to protect public safety in the event of a dam failure. However, such plans for most of the high hazard dams have not been prepared yet. This means that the people and property of Kansas in these specific areas is relatively more vulnerable to the impacts of a dam failure. The Kansas Department of Agriculture, Water Resources Division, maintains a list of these locations.

Historically, levee and dam failure has been shown to have a potentially significant impact on specific areas at risk in Kansas. During the spring floods of 1993 which covered nine Midwest states, a high percentage of crop acres in Kansas City District floodplain areas suffered losses due to overtopping of nine of the 15 units in the federally-constructed Missouri River Levee System, and virtually all the non-Federal farm levees in the district.

The 1993 flood, because of its severity and duration, "has exceeded the capability of the existing database to accurately predict flood-damage parameters," according

to the post-flood report by the Army Corps of Engineers, citing extrapolation of 1973 flood information and professional judgment as the basis for current data at that time.

Studies have shown that the upper Mississippi and Missouri Rivers, from north of Leavenworth, may respond differently in flood situations because of differences in river discharge and slope, floodplain width and sediment load. While the annual discharge is roughly comparable on both rivers, the sediment yield of the Missouri averages five times that of the upper Mississippi.

Levee failure during flood can be a potent economic hazard. More than 1.4 million crop acres were classified as failed resulting in damages totaling $359 million in the 1993 Flood. Damages to cities and towns in the district were estimated at $661 million, while damages to infrastructure were estimated at $274 million. Although the Federal levees held, most needed at least some repair, the cost of which was estimated at $41.9 million; the non-Federal levees' repair bill exceeds $300 million.

Potential dam and levee failure mitigation initiatives:

As severe as the flooding was in 1993, stream and river levels could have been even higher had a system of flood-control reservoirs not been in place throughout the Missouri River Basin.[25]

An analysis of flood discharges in the Kansas River Basin demonstrated the storage capacity of its reservoirs and how peak discharges were reduced substantially, the greatest effect having been observed on Big Blue River near Manhattan. Many other cities and hundreds of thousands of acres of farmland along the tributaries and main stem of the Kansas River benefited from the flood-control reservoirs as flood discharges were reduced by 30 to 70 percent. Manhattan and Kansas City would have had their levees overtopped; without the reservoirs and Federal levee system, Junction City, Manhattan, Topeka, Lawrence and Kansas City would have been flooded.[26]

Damage *prevented* by Kansas District reservoirs is estimated at $4 billion. Local protection levees, including those at Kansas City and Topeka prevented an estimated $4.7 billion in damages, while levees in the Missouri River levee system protecting mainly agricultural land, prevented an estimated $188.3 million in damage.

As structural mitigation initiatives to control flooding impacts, dams and levees clearly have a demonstrated value. Mitigation initiatives to help avoid or minimize the impact of their failure are generally targeted on either maintaining their structural and operational integrity, removing or flood proofing the development occurring in the potential inundation area, or providing for improved emergency response operations to prevent injury or death. Some potential mitigation initiatives for dam and levee failure are given in this table:

[25] Effects of Reservoirs on Flood Discharges in the Kansas and the Missouri River Basins, 1993,
[26] ibid. p. 19.

MITIGATION INITIATIVES FOR DAM / LEVEE FAILURE

Possible Program Mitigation Initiative **NON-STRUCTURAL INITIATIVES**	Higher Priority for KHMT consideration (✓)	Suitable for Local Program Initiative
Conduct engineering studies on dams and levees to determine vulnerability to failure		**Y**
Ensure complete coverage of response and recovery (evacuation) plans for dam locations and vulnerable population		**Y**
Ensure complete mapping areas vulnerable to dam failure	✓	**Y**
Ensure complete coverage of vulnerable areas by warning system(s)	✓	**Y**
Develop and deliver public information and education program on risk and response for vulnerable populations		**Y**
Develop "model" land use code for local government implementation on restricting development downstream of dams	✓	
Develop state-level code or statute requiring "right-to-know" disclosure for property purchase downstream of dams		
Develop state-level codes or statutes for restriction on downstream land development and land uses		
Ensure an adequate state or local inspection and enforcement program for all dams		**Y**
Develop and implement a statewide system for classification of high risk/high consequence dams	✓	
Develop a statewide funding program (e.g., revolving loans) for private individuals to retrofit high risk/high consequence dams		
Provide for identification and inspection of high risk/high consequence levees		
STRUCTURAL INITIATIVES		
Remove older, abandoned or unneeded dams	✓	**Y**
Retrofit/reconstruct high risk/high consequence dams and levees that are vulnerable to failure		**Y**
Relocate structures vulnerable to dam or levee failure in high risk/high consequence areas		**Y**
Install and maintain warning systems for vulnerable populations	✓	**Y**
Install dam/levee failure monitoring devices and systems in high risk/high consequence areas		

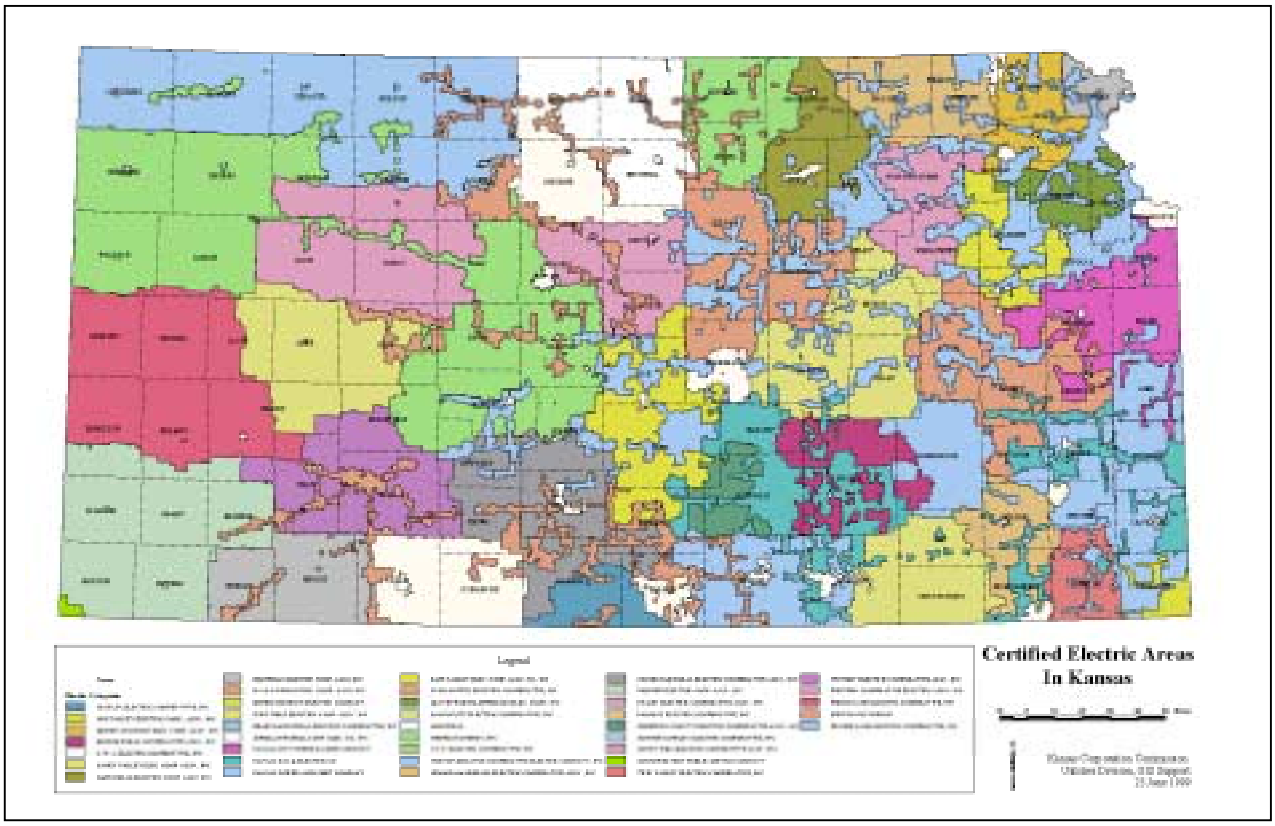
3.4.2 Power or Infrastructure Failure

Infrastructure components are comprised of energy, communications, transportation and utilities. There are several reasons why such interruptions in these components could occur. Of course, there is the interrelationship between damages from other types of disasters such as floods and tornadoes, winter storms or other damaging winds, hazardous material releases, terrorism, wildfires, or extreme temperatures.

The largest utilities in Kansas are Kansas Gas and Electric, Western Resources, Inc., Kansas City Power and Light Company, Board of Public Utilities and Utilicorp

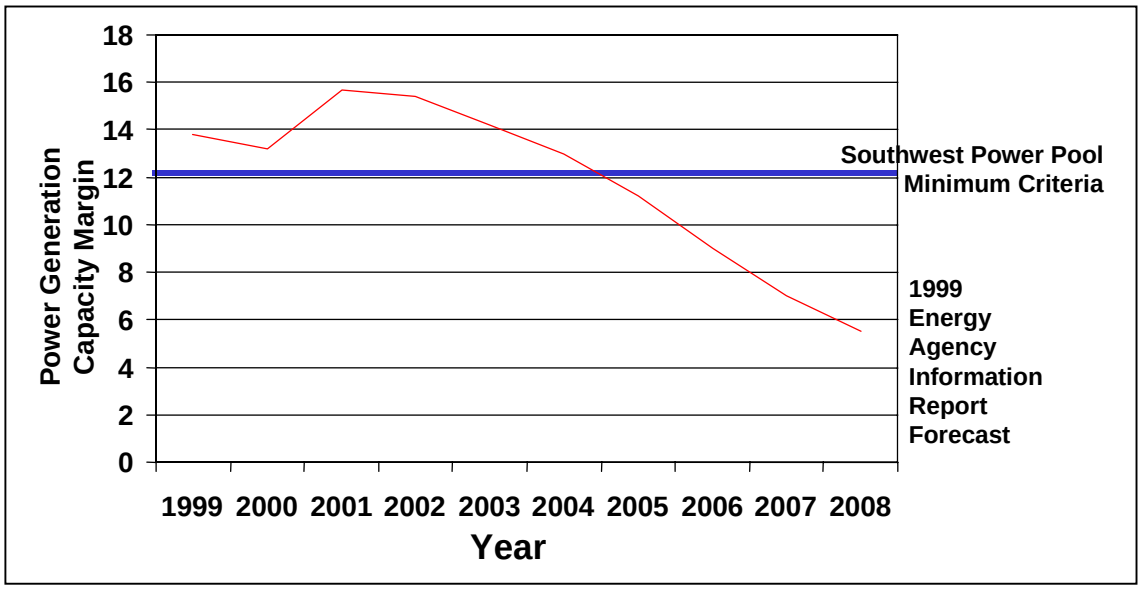
United, Inc. In addition, two nuclear power plants serve Kansas: Cooper Nuclear Station in Brownville, NE, and Wolf Creek in Burlington, KS.

However, as indicated here, much of the state is provided power from a large number of suppliers.



As a general rule of thumb, smaller electrical suppliers have more limited resources to apply to mitigating the vulnerability of their system or services to natural disasters. The large number of electric service providers could mean greater vulnerability of the state in the event of a major, widespread disaster, such as a severe winter storm or ice storm.

In addition, as recent national events have illustrated, the failure of electric power supply service can be due to inadequate or very costly supply sources. The following graph indicates projected electric power availability in the state, based on a recent study by the Kansas Corporation Commission. Although the graph indicates decreasing electric power capacity margins, slipping below the currently recommended regional criteria established by the Southwest Power Pool, the Commission concluded that construction of new generating capacity would alleviate future shortages.



The 1993 Flood is an extreme example of disruption of Kansas' infrastructure. Not only were roads and rivers unnavigable for weeks and months following the flood, but power lines were swept away causing disruption of communication and power services. Tornadoes and winter storms are other natural hazards that typically cause service disruptions in Kansas.

Other components of the infrastructure system, in addition to electric power failure, are important considerations as well in the development of the Kansas Hazard Mitigation Strategy. These components include gas and fuels availability and delivery, telecommunications systems, and the state's transportation network. The vulnerability of the state's communities to failure of these infrastructure components, for the most part, is based on their vulnerability to natural hazards. As a natural hazard impacts the community, one of the most common vulnerabilities is the loss of these critical products and services needed for normal, everyday life.

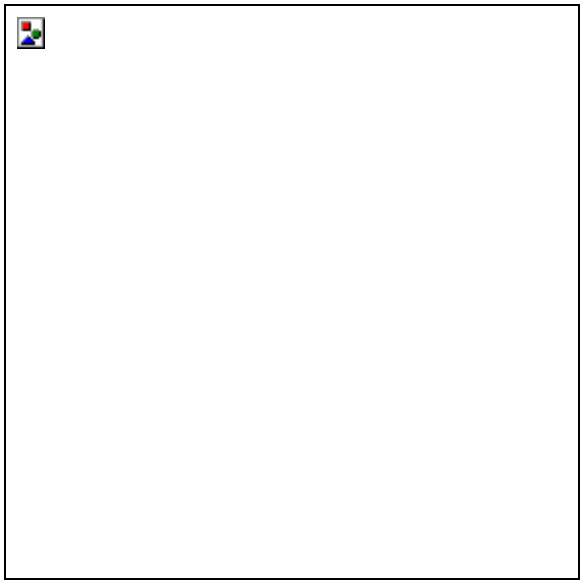
In this sense, nearly every community in the state is vulnerable to the impact of this hazard. The vulnerabilities can be due to the health and safety impacts of such failure, when critical facilities and services cannot be provided due to loss of utilities. Numerous safety devices in the community may not function, such as traffic lights, and injury or fatalities can result. The economic impacts can also be enormous, for prolonged utility or infrastructure failure can be a serious impact on business and industry operations, resulting in lost revenues, lost jobs, etc. Even the loss of such commonly necessary community services as schools and institutions can be very disruptive to the welfare of the community.

Potential power loss / infrastructure failure mitigation initiatives:

In general terms, mitigation initiatives for power loss or infrastructure failure are directly tied to those initiatives needed to avoid or minimize the impact of natural hazards. Such mitigation initiatives have been summarized above. Some additional initiatives are given in this table:

MITIGATION INITIATIVES FOR POWER AND INFRASTRUCTURE FAILURE

Possible Program Mitigation Initiative **NON-STRUCTURAL INITIATIVES**	Higher Priority for KHMT consideration (✓)	Suitable for Local Program Initiative
Promulgate state requirements for designated critical facilities and systems to have back up electric power and/or redundant water and gas supply services	✓	
Promote and/or require community utilities to have redundant sources of power, water and gas supplies and/or standby capabilities available		
Provide for public safety education on the use of "temporary" home use of generators, gas burners, charcoal grills, candles, etc.		
Establish criteria for state emergency intervention in regional or local utility system failure/outage		
Ensure the statewide development and use of effective priority utility restoration plans for electricity, water and gas		
Require and/or encourage county emergency plans to incorporate emergency response mechanisms for utility failure or prolonged outage		**Yes**
Purchase and/or contract for rapid availability of generators for institutions and/or homes		**Y**
Promulgate criteria for minimum standby utility requirements to maintain the continuity of local government operations.		
Develop plans for rapid relocation of critical governmental operations to alternative facilities in the event of prolonged utility failure or blockage of access		
STRUCTURAL INITIATIVES		
Install generators at critical facilities	✓	**Y**
Wire facility/critical components to accept portable generators	✓	**Y**
Install battery back-up systems for critical operations, e.g., 911 centers, hospital computers	✓	**Y**
Relocate critical operations to facilities with back-up power, supplemental utilities, and alternative access routes		**Y**
Install below ground electric services to critical facilities		**Y**
Remove trees that threaten above ground power lines during high wind incidents		**Y**
Construct redundant utility services (power, water, and gas) to critical facilities		**Y**
Relocate critical state and local government operations to facilities less vulnerable to utility or access disruption		**Y**
Construct and/or equip facilities within vulnerable communities to serve as shelters and/or victim assistance services centers during prolonged power or infrastructure failure		**Y**
Provide storm proofing of wire, poles, anti-galloping devices to better serve the service to the community	**X**	**Y**



3.4.3 Water Contamination

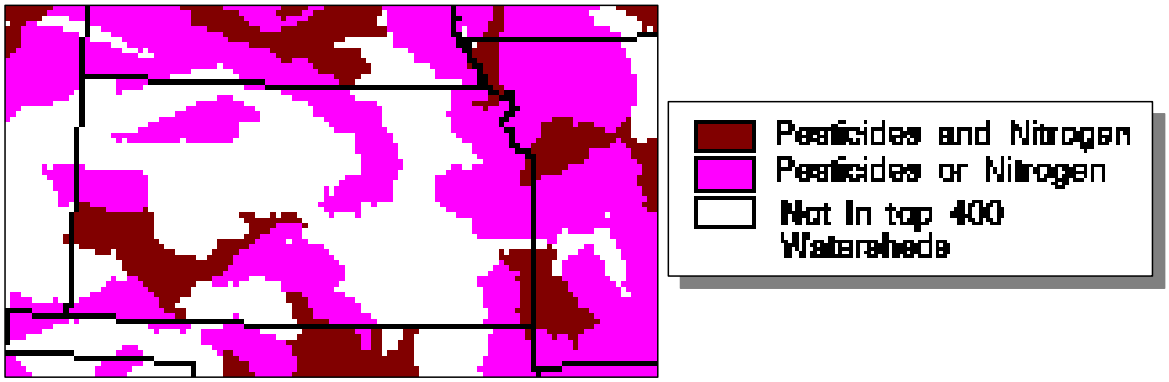
Surface and ground water have been crucial resources in Kansas, and their use is unevenly distributed across the state.
Of groundwater use, 91.2 percent is for irrigation, 4.8 percent for municipal use, and 2.4 percent for industrial use. Surface water is shared 48.6 percent municipal, 26.2 percent recreational, 14.6 percent industrial, 7.8 percent irrigation, primarily.

Agriculture continues to be the largest industry in Kansas and about one-third of its productivity is based on irrigation. From the production of corn to feed lots, to meatpacking plants, the state's largest industry is dependent upon ground water. While aquifers were once thought to be an inexhaustible supply of water, evidence has shown that water resources are not infinite and heavy pumping could cause adverse impacts on water quality in the future.

The following chart summarizes the water resource characteristics of Kansas There are more than 1100 public water supply systems in the state consisting of municipal utilities, rural water districts and privately owned systems.

The total population using ground water is approximately equal to the total population using surface water in Kansas.

Kansas Watershed with a High Potential for Pesticide and Nitrogen Leaching



Ditch and canal miles	382
Number of public lakes/reservoirs/ponds	279
Acres of public lakes/reservoirs/ponds	173801
Acres of public freshwater wetlands	35527

source: 1994 Kansas Water Quality Report (305(b)report)
Kansas Department of Health and Environment

Between 1990 and 1995, the population served by surface water increased by eight percent, primarily due to growth in urban areas using water supplies from the Kansas River and Federal reservoirs.[28]

Public supply represents about nine percent of total annual nonpower-related water withdrawals; ground water is the predominant source of supply in the six western basins, and surface water the predominant source of supply in the six eastern basins.

A major concern must be the threat to public health from degradation of water quality for drinking, for fish, shellfish consumption. The most common inorganic contaminant in Kansas ground water is nitrate.

Some other sources of contamination of water in Kansas are:

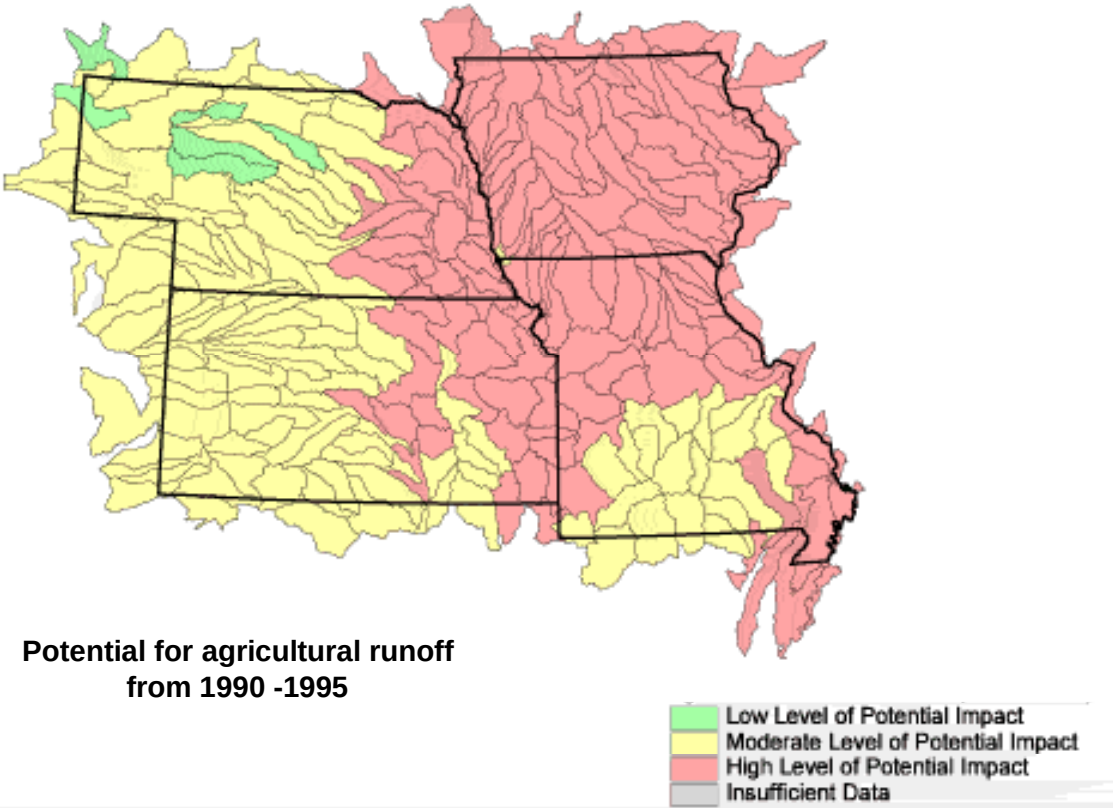
- Natural salt contamination intrudes into the High Plains aquifer and discharges into the Arkansas River

[28] ibid., p. 2

- Human factors such as potential contamination from agricultural chemical or contaminant waste sites
- Higher and more intense rainfall also could increase erosion and exacerbate levels of pollution in runoff
- Storm runoff from urban areas, runoff and seepage from mining areas in south-eastern Kansas, and runoff from agricultural lands
- Of 960 private wells tested in 1993-4, 45% had total coliform, 18% E. coli, 24% nitrates
- Major impact in stream miles in 1998 from pathogens, salts and sulfates; sources primarily agriculture-related
- Currently the most commonly cited impairment of streams is caused by excessive levels of fecal coliform bacteria.[29] (The average statewide concentration of fecal coliform bacteria has also been reduced in the last 20 years, attributable in part to better disinfection of wastewaters.)
- Other impairments to streams are boron, cadmium, chloride, chlordane, dissolved oxygen depletion, fluoride, ammonia, pH, selenium, sulfate and zinc.
- Major impact in lakes by acre for 1998 were turbidity, nutrients and suspended solids; sources were agriculture, municipal point sources and natural sources, which affected about half the lake acres.

[29] Kansas Environment 2000, KS DHE, p.6

- The predominant impairment to lakes in Kansas is eutrophication, or the biological response of a lake to elevated nutrients, organic matter, and silt. Other issues of concern are presence of pesticides, dissolved oxygen, pH, chloride, sulfate, fecal coliform bacteria, siltation, excessive aquatic plant development, bad taste or odor, and hydrologic limitations such as insufficient inflows, inadequate volume or depth, surface area below planned levels.



Potential for agricultural runoff from 1990 -1995

Water degradation can cause economic damage through reduced potential uses and foreclosure of future resource use options, through agricultural, irrigation and livestock uses. Kansas has a significant statewide vulnerability to the hazard of water contamination.

Irrigation represents the largest use of water in Kansas, at 87 percent of the total annual non-power-related supply. Drawn from more than 30,000 points of diversion, more than 90 percent of withdrawals are from ground water. Largest withdrawals are in the Upper Arkansas and Cimarron Basins.

While the amount of ground water used between 1990 and 1995 declined by 21 percent due to wetter weather, statewide, about 15 percent more surface water was used for irrigation in 1995 than 1990 because there was greater availability of water in rivers and reservoirs supplying the Upper Arkansas and Solomon Basins.

Withdrawals for industrial and mining purposes only constitute two percent of the total, 80 percent of which is ground water. Surface water withdrawals, which increased considerably, are primarily related to the production of sand and gravel and represent non-consumptive use. Ground water use declined in most basins during that five-year period.

Livestock water use represents another two percent of total annual withdrawals. In nine of the 12 basins, water use in this category rose.

Lastly, though water for thermoelectric power generation is the second largest category of use after irrigation, 95 percent of it is non-consumptively used and returned to the environment or recycled. All but the one nuclear facility of the state's 25 power plants burns fossil fuels. Ninety-nine percent of the water withdrawn comes from surface water sources.

Protection of the quality of the water resources of the state is a high priority, and assessing the severity of the threat to water supplies is critical to protecting it. Total Maximum Daily Loads (TMDLs), or the maximum amount of a pollutant a stream or lake can receive without violating water quality standards, taken in conjunction with the designated use of the body of water, determines what standard of water quality will be applied.

Potential water contamination mitigation initiatives:

Pending EPA approval, the State of Kansas is planning to implement activities overt the next 10 years to limit effluent discharges from point sources such as municipal and industrial, through the National Pollutant Discharge Elimination System permit process. Implementation activities for non-point sources such as siltation (others being rainfall, snowmelt or irrigation) will be directed toward technical assistance, educational outreach and financial incentives. Best management practices will be used in critical, pollutant contributing areas of watersheds, with follow-up monitoring. In also establishing and implementing basin-oriented TMDL's, the state will pursue water quality goals expressed by surface water quality standards of the Kansas Water Plan, with the goal of significantly increasing the percentage of stream miles and lake acres that can fully support their designated uses.[30]

While many of the current flood mitigation plans for communities involve the buyout or movement of threatened structures, there are some options available to treatment plants in immovable locations.[31] Stream bed management such as dredging, realigning the channel or upstream damming may be possible solutions, or physical barriers constructed around the plant such as flood walls, dikes, or earthen berms, so long as such techniques are assess first for any subsequent hydrologic changes in the system that could be damaging in the future.

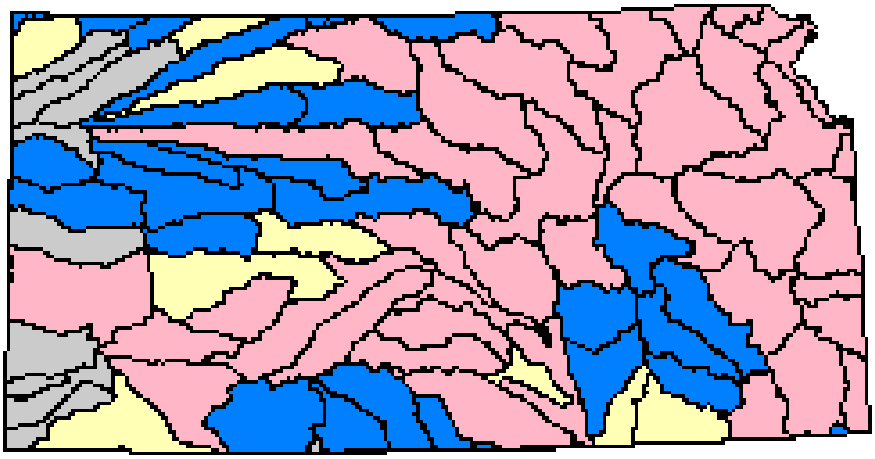
[30] Kansas Environment 2000, Ks DHE, p. 6
[31] Small Flows Quarterly, Summer 2000, Vol. 1, No. 3, p.32

Demand for water is growing in several river basins prompting state officials to develop water planning and management strategies for each basin. In addition there is a need to know the effect of water-right administration and management strategies on water budgets in basins. Evaluation of aquifer systems crossing major river basins is a major tool in understanding alluvial-aquifer dynamics.

The KGS Water Information Storage and Retrieval Database includes information on wells measured such as depth to water the aquifer encountered, etc., and in conjunction with the KDHE there is water well drilling information on location, type, use, casing, nearest source of contamination of the well drilled.

Kansas has undertaken water quality monitoring programs for surface water, regularly testing both stream chemistry samples and biological samples. Through fish tissue monitoring, higher concentrations of chlordane, mercury and PCB's have been found. Levels of chlordane have been declining since the substance was banned in 1988; mercury has increased but not to excessive levels. Urban areas account for most of the bioaccumulative contaminants such as the PCB's and chlordane, the latter attributed to inflated application rates of pesticides to lawn and landscape (in comparison with rates used in agriculture).

The following map indicates those watershed areas of the state that are priorities for restoration to applicable water quality standards as of 1998:



Highest Restoration Priority
Other Restoration Priority
Meeting Standards
Very High Quality
Need More Information
Source: KDHE

Research also continues on mineral intrusion in the aquifer of the eastern Great Bend Prairie and the western Equus bed areas; water quality and ground water declines in the upper Arkansas River corridor.

Other projects are ongoing such as EPA and other partners assisting in preservation of water quality in Hillsdale Lake; Kansas River Watershed Enhancement Initiative to facilitate preservation; and another EPA-partnered project along the mainstem of the Missouri River.communities. In a water body free of pollution stress, one would expect to find communities that are pollution intolerant and have a greater diversity in types of organisms present. Two upgrade projects at sewage treatment plants (Smoky River downstream of Salina and Arkansas River downstream of Wichita) have shown positive results.

Additional water contamination mitigation initiatives are given in the following table:

MITIGATION INITIATIVES FOR WATER CONTAMINATION

Possible Program Mitigation Initiative **NON-STRUCTURAL INITIATIVES**	Higher Priority for KHMT consideration (✓)	Suitable for Local Program Initiative
Expand current permitting, control, inspection and enforcement of point and non-point pollution control programs	✓	
Establish programs to encourage or require buffer zones between surface waters and agricultural and land development uses		
Develop and deliver public education programs on the adverse health and economic impacts of water contamination		**Yes**
Promulgate limits on the agricultural use of chemicals		
Provide training programs for selected professions, e.g., farmers and ranchers, on techniques to prevent or minimize water pollution		
Improve programs and plans to prevent, detect and respond to hazardous materials spills in Kansas for protection of ground and surface waters		
Promulgate codes, standards and/or guidelines for use of septic tanks, landfills and similar development in high permeability soils/aquifer recharge areas		
Provide services for more frequent or thorough inspection of facilities discharging wastes to lands or waters and more aggressive enforcement of existing requirements		**Y**
Identify outdated/inadequate community waste water treatment systems and prioritize for replacement or rehabilitation	✓	
STRUCTURAL INITIATIVES		
Construct new and/or rehabilitate outdated, inadequate community waste water treatment facilities	✓	**Y**
Implement remediation projects at hazardous waste sites; landfills, etc. to prevent or minimize ground water contamination	✓	**Y**
Purchase additional equipment and supplies for more rapid and effective response to spills of contaminating materials		**Y**

MITIGATION INITIATIVES FOR WATER CONTAMINATION (Con't)

Possible Program Mitigation Initiative **STRUCTURAL INITIATIVES**	Higher Priority for KHMT consideration (✓)	Suitable for Local Program Initiative
Purchase lands for public preservation to serve as buffers to valuable surface waters or for aquifer recharge areas		**Y**
Construct treatment facilities for improved management of animal wastes		**Y**

3.4.4 Hazardous Materials

Hazardous materials are defined as a hazard for concern for the Kansas Hazard Mitigation Strategy by the KHMT due to the potential that a sudden, accidental release of such materials, or their intentional illegal release, can be dangerous to human health and safety, to property and to the quality of the environment. Nearly all of the communities of Kansas, both urbanized and rural, are vulnerable to the potential impacts of the release of hazardous materials. Such releases may come from accidents or illegal releases from both fixed sources, such as a manufacturing or storage facility, or from a transportation source, such as a truck or pipeline. In addition, there is also a possibility that a terrorist could select such a hazardous materials site in Kansas as a target, with the intention of taking an action to release the hazardous materials for criminal purposes.

The are numerous accidents with hazardous materials in Kansas, and highlights of some past incidents are:

- In 1998 a train carrying hazardous chemicals derailed and caught fire sending a cloud into the air and forcing evacuation of Hazelton.
- There have been 3445 instances of oil or chemical spills reported to the National Response Center since 1990.
- For those reported instances a hazardous materials spills, there were 1981 spills in 1994; 2003 in 1995; 1891 in 1996; 2049 in 1997; 2178 in 1998, and 1715 in 1999. Last year, 84% occurred in fixed facilities; 8% by motor carrier; 5% by pipeline, 1% railway, and 2% other. Of the spills related to transportation, the most frequent hazard classes were 60 compressed gas, non-flammable; 28 corrosive materials, and 20 chlorine.[34]
- On June 8, 1998, a massive explosion took place at the DeBruce Grain Company, of Haysville, Kansas. All the fatalities from grain elevator explosions in 1998 occurred in this one accident. Eleven people were injured, and seven died.

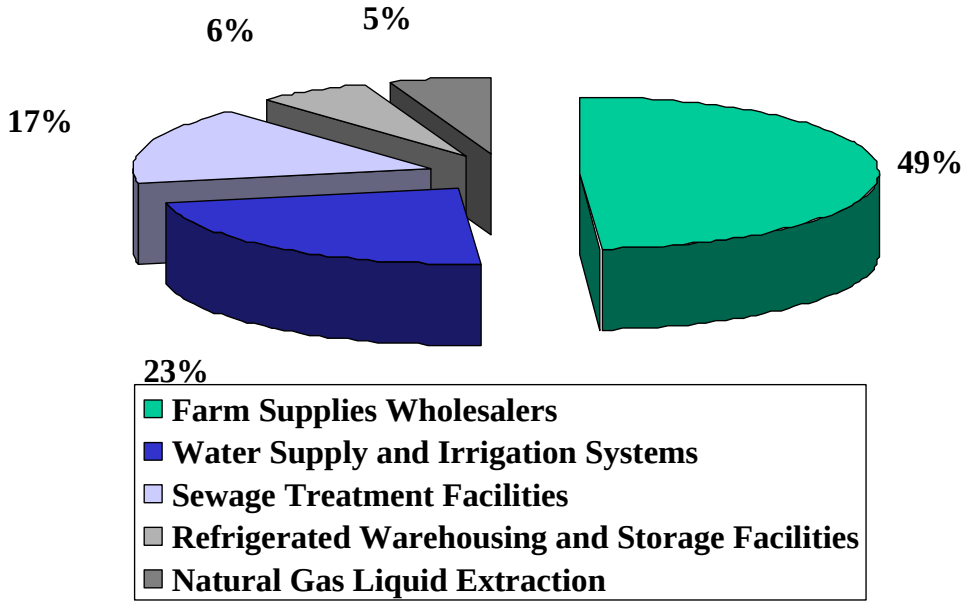
The Toxic Release Inventory (TRI) was established under Section 313 of the Superfund Amendments Reauthorization Act (SARA) on Oct. 17, 1986, requires that releases of chemicals into the environment above certain thresholds to report them each year. This list is intended to address fixed facilities that are making legally permitted releases to the environment, rather than accidental releases of the direct

[34] http://www.kwo.org/drought/main.html

concern to the Kansas Hazard Mitigation Strategy. Nevertheless, these facilities do indicate the presence of hazardous materials that could be involved in an accident. The list of designated chemicals and chemical categories includes more than 600 entries. Seven additional industrial groups were required to submit reports after 1997 which included coal mining, metal mining, coal or oil fired electrical generating facilities, hazardous waste treatment or disposal, petroleum bulk plants and terminals, chemical wholesale, and solvent recycling. A total of 72 sites are registered with the Agency for Toxic Substances and Disease Registry for Kansas.

In addition to these facilities, facilities that store or use chemicals considered unusually dangerous to human safety are required by Section 112R of the Clear Air Act Amendments to assess the potential impacts of an accidental release of the chemical at their facility and to prepare emergency plans termed, "Risk Management Plans (RMP)." Of particular interest to Kansas is that ammonia is one of the covered hazardous materials, and numerous ammonia storage and distribution facilities throughout the state have filed an RMP with the Environmental Protection Agency (EPA). The following chart, based on national data, illustrates the potential vulnerability of an agricultural state such as Kansas to a hazardous materials release, using the filing of RMPs as a surrogate measure:

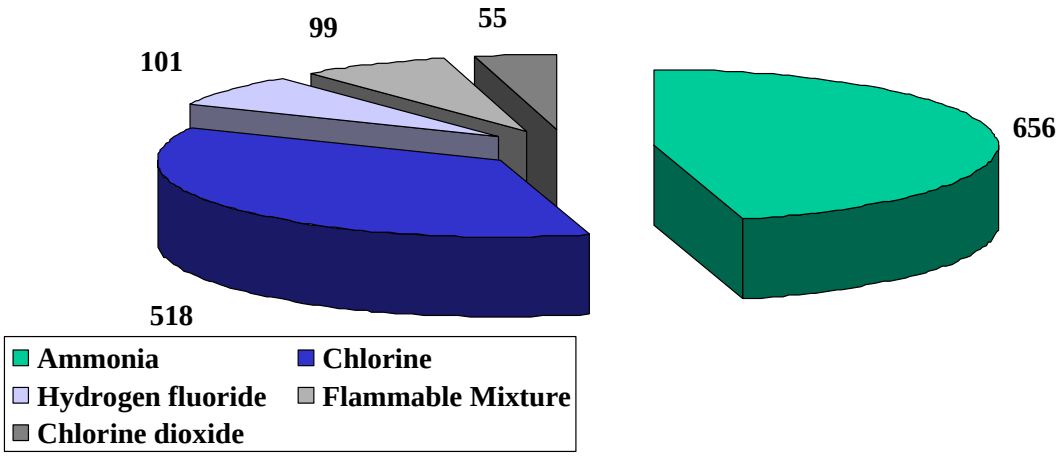
The Top Five Categories of Facilities Preparing and Submitting Risk Management Plans under Sec. 112 R of the Clean Air Act Amendments



Nationally, it is clear that the type of agricultural facilities that can be found throughout Kansas are likely to have dangerous materials present that could pose a threat to surrounding populations in the event of an emergency or disaster. A database with the name, location and summary of the RMP for the facilities for Kansas is available through the EPA. With this information, the KHMT is able to identify specifically the populations that could be at risk from this hazard.

It is also important, when considering the vulnerability of Kansas' communities to a hazardous materials event to recognize the materials most frequently involved in such accidents. Using nation wide data as a surrogate measure for the possible situation in Kansas, the following chart indicates that ammonia, a very common chemical to find in Kansas, is frequently involved in hazardous materials accidents.

The "top five" materials involved in accidents for 1994-1999 for facilities preparing and filing risk management plans



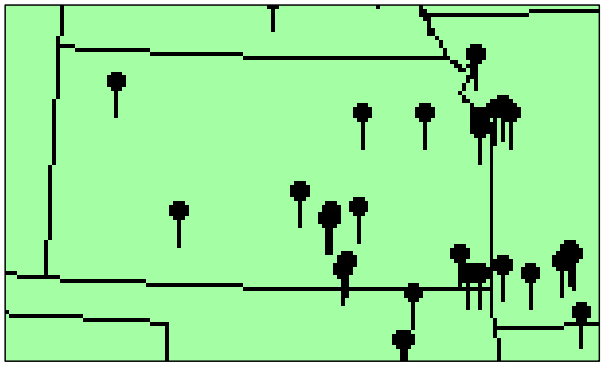
This chart indicates that ammonia is the chemical most frequently involved in hazardous materials accidents at facilities filing RMPs in the nation. In light of this, it is important to note that 86% of the RMPs filed by 782 facilities in Kansas are for ammonia.

There are indications as well that Kansas' communities are potentially vulnerable to hazardous materials accidents from transportation sources. For example, based on a database of vehicle inspections of hazardous materials highway transporters, the Kansas Highway Patrol identified thirty-seven hazardous materials violations were recorded for 2000 through mid-August from inspections of sixteen different carriers.

It is also important to consider that radioactive materials are a potential source of hazardous materials accidents that could threaten the health and safety of some communities in Kansas. The Wolfe Creek Nuclear Power Plant is a facility where an accident could result in the release of radioactive materials, and an emergency plan for the communities within 50 miles of this facility is maintained and practiced in case of such an accident. Information about this plan and these communities, as well as information for a limited number of Kansas communities within 50 miles of a nuclear plant in Nebraska, is available through the Kansas Division of Emergency Management.

Legal and illegal disposal of hazardous materials is another possible source of vulnerability of Kansas' communities. This map is an illustration of the sites within the state that are sufficiently contaminated with hazardous materials to be considered as designated "Superfund" sites with remediation under the supervision of EPA.

The release of hazardous materials can have deleterious effects on humans and the environment. In 1999, six persons died and another 54 sustained injuries due



Superfund Hazardous National Priority List Sites as of 1995

to hazardous substances releases in Kansas. This information is an indication that there are potentially significant vulnerabilities to many communities throughout Kansas from the accidental release of hazardous materials.

Potential hazardous materials mitigation initiatives:

There are many approaches to mitigating the vulnerabilities of Kansas' communities to the accidental releases of hazardous materials. For example, currently the Kansas Fire Marshal's Office is developing a program to create regional hazardous materials response teams to provide additional capabilities to prevent, lessen or more effectively manage hazardous materials accidents.

The Technological Hazards Section of KDEM provides direction and planning concerning potential accidents involving hazardous substances such as toxic chemicals, radioactive substances and potential releases from nuclear power plants. The program also is responsible for maintaining a Wolf Creek Nuclear Power Plant emergency response plan, accident management off-site and statewide emergency notification. (The section has responsibility for emergency planning and exercises with Cooper Nuclear Station in Brownville, NE as well.) About 70,000 radiation detection devices for use by various public agencies in case of radiological materials accidents are available through this section, which also administers the Hazardous Material Emergency Preparedness Grant Program (HMEP) of 1990.

The Kansas Department of Human Resources also operates an industrial safety program, which, in part, addresses the handling of hazardous materials and worker health and safety at fixed facilities across the state. These inspections provide opportunities for the state to offer technical information to facility management to prevent accidents or to mitigate their potential effect.

In addition to these current mitigation efforts, the following table also provides some example mitigation initiatives:

MITIGATION INITIATIVES FOR HAZARDOUS MATERIALS

Possible Program Mitigation Initiative **NON-STRUCTURAL INITIATIVES**	Higher Priority for KHMT consideration (✓)	Suitable for Local Program Initiative
Train additional state and local emergency services personnel for spill/release response		**Yes**
Hold periodic full-scale exercises with state, local and industry responders		
Conduct hazardous materials commodity flow studies		**Y**
Develop risk maps for HazMat transport routes and fixed facilities		**Y**
Identify and map vulnerable populations and environmentally sensitive areas located within HazMat spill/release risk zones from transportation or fixed facilities	✓	**Y**
Adopt policies/codes that restrict/mitigate transport routes and/or locations of fixed facilities		
Develop public education on HazMat issues and protective actions		**Y**
Develop policies and guidance for incorporating risk management plans into local comprehensive emergency management plans	✓	
Require incorporation of risk management plans into local emergency management plans		
Require, encourage and conduct protective action planning by sensitive institutions (e.g., schools, medical facilities) within HazMat impact zones	✓	**Y**
Increase or expand existing programs for HazMat transport inspection, fixed facility audits, etc. to improve spill prevention		**Y**
Develop a program for certification and effective utilization of State and local HazMat response personnel		
STRUCTURAL INITIATIVES		
Provide additional equipment, supplies and vehicles to state and local HazMat teams to achieve quicker and more effective response		**Y**
Retrofit fixed facilities with spill prevention, containment and minimization equipment		**Y**
Retrofit government facilities to avoid or minimize HazMat releases		**Y**
Install monitoring and detection equipment at or near high risk areas and/or highly vulnerable institutions		**Y**
Install public warning systems in high risk areas	✓	**Y**

3.5 Criminal Hazards

The area of Criminal Hazards will include discussions of Terrorism, and Civil Disturbances. Kansas has been fortunate to date to not have experienced any significant episodes of this type of hazard, and the potential vulnerability of the communities of the state must be based on prediction and estimation, rather than on historical evidence of impact to the state's population, property or the environment. Nevertheless, even in the absence of an historical record of terrorism and civil disorder, the KHMT recognized that the state and its communities are potentially vul-

nerable to future events, particularly based on the experiences of other parts of the nation and the world.

3.5.1 Terrorism

The Department of Defense definition of terrorism is "the calculated use of violence or the threat of violence to inculcate fear; intended to coerce or to intimidate governments or societies in the pursuit of goals that are generally political, religious, or ideological." The threat of terrorism is ever present, and an attack is likely to occur when least expected. Combating terrorism requires a continuous state of awareness; it is a necessary practice rather than a type of military operation. [35]

Characteristics of crimes of terrorism are that though they may appear to be senseless and random, the attacks make sense to the terrorists; terrorists need to publicize their attacks; and every possible target cannot be protected all the time.

There is little information about terrorist activities in Kansas, except for two past, documented experiences:

- Letter bombs mailed to Leavenworth Prison
- Attacks on abortion clinic doctors

For purposes of the Kansas Hazard Mitigation Strategy, it is important to recognize that every state in the nation is vulnerable to a terrorist attack, and that targeted government or business officials, as well as members of the general public, could become victims. The infamous terrorist attack by Timothy McVeigh on the Federal Building in neighboring Oklahoma City is a lesson for Kansas about the need to address vulnerabilities to terrorism.

The presence of “hate” groups or similar extreme organizations can be taken as a surrogate measure of the likelihood of a terrorist attack. The Southern Poverty Law Center indicates there are 217 “patriot” groups active in the US, 68 of which are militia, four “common law courts” and a variety of other categories. Those listed for Kansas are the Kansas Territorial Agricultural Society in Topeka, the Court of Christian Jurisdiction in Topeka, and the Constitutional Party in Wichita.

Of the 457 active hate groups known in 1999, groups are categorized as Klan, Neo-Nazi, Skinhead, Christian Identity, Black Separatist, and other. Within Kansas, The Westboro Baptist Church of Topeka, Aryan Nations in Wichita and Hammerskin Nation of Wichita have established groups. There were no further figures identifying numbers of members in each group. (Hate crimes are defined as those motivated by the offender’s bias.)

In addition, national statistics indicate that violence still plagues about 25% of the nation’s abortion clinics, and most recently ecological terrorist, extreme animal rights activists and anti-economic development terrorist organizations have been active.

[35] www.geocities.com/CapitolHill/2469/basics.html from Terrorism Research Center

While there may not be significant historical evidence to demonstrate a vulnerability to terrorism in Kansas, there is sufficient rationale to recognize that the state and all of its communities are potentially vulnerable to this hazard.

Those persons most at risk are those working in government facilities, nuclear power plants, abortion clinics, and minorities, (blacks number about 156,600, and Hispanics, 140,665). Business owners who are minorities may be at risk as well as those types of businesses that may be seen as supported by government, serving controversial clientele, or selling unpopular products.

The threat of cyberterrorism also must be considered and that for a state such as Kansas, government and industrial services that are highly dependent on the Internet, telecommunications and computer networks may have significant vulnerability from this terrorism hazard.

Some of Kansas' communities have nuclear facilities, transportation infrastructure, water systems, government buildings, including the Capitol in Topeka and county courthouses, abortion clinics, or other facilities or services that should all be considered as vulnerable to terrorist attack. In this way, every county in the state has some degree of vulnerability to this hazard.

Potential terrorism mitigation initiatives:

Currently, the Kansas Highway Patrol, the Kansas Department of Health and Environment, and the Kansas Division of Emergency Management are actively participating in different aspects of the US Department of Justice's Domestic Preparedness Program. This program is being conducted nationwide, and assists states and local governments to become better prepared for a terrorist attack involving a weapon of mass destruction (i.e., a chemical, biological or radiological agent used as a weapon for harming large numbers of individuals). This program is providing support for improved preparedness of the emergency response and medical communities, for assessing vulnerabilities to terrorist attacks, for identifying potential targets, and for planning the emergency response to such an attack. The information being developed for this program is not yet available, and could not be incorporated into this edition of the strategy. However, the participating agencies are members of the KHMT and the several mitigation implementation assignments have been incorporated into the management plan to address reduction in vulnerability to a terrorist attack.

Other potential terrorist incident mitigation initiatives are listed in the following table:

MITIGATION INITIATIVES FOR TERRORISM

Possible Program Mitigation Initiative ** Recommended for Local Program Initiative* **TERROISM INITIATIVES**	Higher Priority for KHMT consideration (✓)	Suitable for Local Program Initiative
Identify potential terrorist targets and determine their vulnerability *	✓	**Yes**
Identify and prioritize corrective actions to include building retrofits, relocating government operations, developing redundant systems; security, detection and monitoring equipment; protective gear; terrorism response equipment, etc. *	✓	**Yes**
Develop comprehensive guidance for anti-terrorism planning and mitigation techniques *	✓	**Yes**
Partner with industry and utility groups to identify and minimize risk of privately owned systems (e.g. electric power systems, water systems, etc.)	✓	**Yes**
Law enforcement cooperation in conducting background investigations, timely information sharing, identification and monitoring of active dissident groups	✓	**Yes**
Promote/sponsor appropriate level training for government employees, public safety and emergency services personnel *	✓	**Yes**
Evaluate emergency plans through state sponsored exercises with local authorities and businesses	✓	**Yes**
Develop and implement instructional program for medical practitioners on the identification and treatment of chemical, biological and radiological terrorism agents	✓	**Yes**
Seek funding sources for anti-terrorism training, equipment and structural mitigation programming	✓	**Yes**
Support legislative measures to enhance mitigation initiatives (including anti-terrorism)	✓	

3.5.2 Civil Disturbance

Civil disturbances have been more commonly experienced in the US, particularly in the 1960's, in urban areas and on college campuses particularly around the issues of civil rights and war protests. There are reports of college student protests and unrest during this time at the University of Kansas. However, There is little information on civil disorder events occurred in Kansas, except the 1920 Independence Kansas Riots. These were reported to be a racially based "shooting event" necessitating the deployment of the Kansas National Guard, due to the inability of local law enforcement resources to manage the situation

As with the hazard of terrorism, even in the absence of a historical record of events of this hazard, it has been included in the Kansas Hazard Mitigation Strategy because of the potential that it could occur in the state.

It is assumed that most communities of the state are not likely to experience civil disorder as a hazard, barring some extraordinary and unpredictable circumstance. The communities considered to be most vulnerable to this hazard are low income, urbanized areas, large gathering places, such as sports stadiums, and universities.

Civil disorder and riots, like terrorism, are a crime, and could be anticipated to be more likely to be committed by low income populations or those perceiving themselves as in some manner disenfranchised from the principal populations of Kansas. In this light, it is of interest to note that violent crime rates peaked in 1992 in Kansas from 12,888 and declined to 10,438 in 1998. Property crimes peaked at 125,616 in 1991 and fell to 117,299 in 1998, and poverty rates for Kansas were 11 percent in 1995 and 14.9 percent for children under 18. These facts seem to indicate that, with the exception of temporary gatherings of individuals under highly charged circumstances, e.g. large sporting events, meetings of controversial groups, etc., the vulnerability of Kansas to civil disorder is not significant.

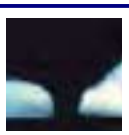
Potential civil disorder mitigation initiatives:

There are perhaps three basic approaches to mitigating the vulnerability to civil disorder events. One is to take action to alleviate the possible underlying causes, such as poverty. Community development and improvement programs, as well as community intervention programs, may be examples of a possible initiative. Another category is to examine the physical environment of the locations where such events could occur to determine if there are structural or operational modifications that could prevent an episode or lessen its scope. Initiatives in this category could apply to locations such as prisons and jails, sporting arenas, etc. The third category is to have an emergency response organization that is better prepared to manage these situations, perhaps through improved emergency planning, training and availability of equipment.

Examples of possible civil disorder mitigation initiatives are provided in this table:

MITIGATION INITIATIVES FOR CIVIL DISORDER

Possible Program Mitigation Initiative **NON-STRUCTURAL INITIATIVES**	Higher Priority for KHMT consideration (✓)	Suitable for Local Program Initiative
Develop response plans for dealing with civil disturbance and supporting local authorities at special facilities or locations, e.g., prisons, universities, major sports arenas		**Y**
Identify and train state and local government personnel for riot control operations		**Y**
Train with local jurisdictions and hold periodic full-scale exercises		
Identify facilities and locations most likely to experience civil disorder		
Research, develop and utilize predictive approaches to identifying situations more likely to experience civil disorder		
Develop and implement program to provide intervention techniques for avoidance or mitigation of civil disorder	✓	**Y**
Provide training for community leaders in civil disorder potential recognition and intervention		**Y**
Develop and provide training for state and local law enforcement agencies and personnel in civil disorder management	✓	

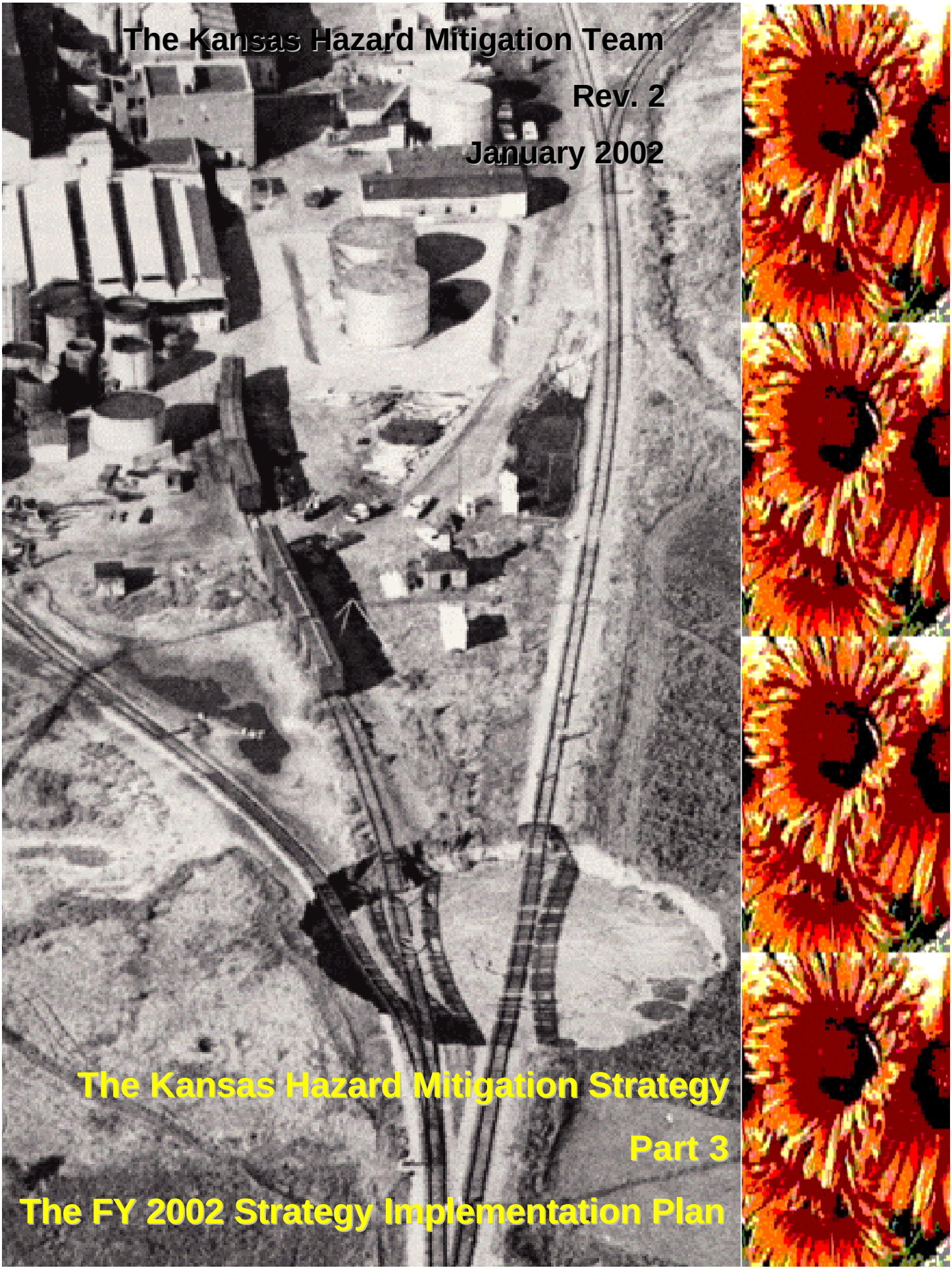


Evaluate and strengthen statutes for penalizing perpetrators of civil disorder		
STRUCTURAL INITIATIVES		
Purchase equipment, supplies and vehicle(s) for use in civil disturbance situations		**Y**
Purchase necessary personal protection equipment for state and local law enforcement personnel		**Y**
Relocate sensitive or vital government functions away from/out of facilities or locations most vulnerable to civil disorder		**Y**
Improve structural security at vital or sensitive government facilities or locations vulnerable to civil disorder	✓	**Y**
Develop and implement a structural retrofit program for older/less secure state and local prisons	✓	**Y**

4.0 Maintaining the hazard identification process

In this edition of the strategy, the KHMT has described the more significant natural, technological, and criminal hazards that threaten Kansas, the ways that the state's communities may be vulnerable to these hazards, and various approaches to mitigate those hazards. The KHMT also identified a current priority for addressing those hazards and mitigating the vulnerability of Kansas' communities to the impacts of those hazards.

Nevertheless, like most other aspects of planning, the hazard identification and vulnerability assessment process must be adjusted to changing conditions in the community, to improvements in the state of knowledge regarding how communities are vulnerable to disaster events, and ways to more effectively mitigate those vulnerabilities. Therefore, it is the intention of the KHMT that the analysis contained in Part Two of the Kansas Hazard Mitigation Strategy will be routinely updated and improved in the years ahead as a normal part of maintaining the strategy and preparing the annual management plan.



The Kansas Hazard Mitigation Team

Rev. 2

January 2002

The Kansas Hazard Mitigation Strategy

Part 3

The FY 2002 Strategy Implementation Plan

INTRODUCTION: *Annual Management Plan*

Part 3 of the Kansas Hazard Mitigation Strategy is the annual management plan for the year beginning July 1, 2001, or for FY 2002. In the annual management plan, the KHMT documents assignments made to the participating agencies and organizations to actually implement the strategy. It is through the implementation of the tasks described in the annual management plan that the KHMT will work toward achieving the goals identified in Part 1 of the strategy. It only is the KHMT participants' staff, programs, authorities and expertise, in the execution of the assignments detailed in this section, that can make the strategy come to fruition and ultimately make Kansas a disaster resistant state.

In this section of the strategy, detailed information is provided regarding the tasks to be completed, the organization responsible, the work products to be produced, and the schedule for their completion. Overall, Part 3 of the strategy identifies a three-year program, for with the resources available to the participating agencies, it is not possible to complete the complex array of tasks needed to implement the strategy in a single year. For the many large and more complex tasks, they have been phased over the entire three-year period. In its implementation, the first year's assignments in the strategy are the focus of the KHMT's efforts. As progress on each is made, the details of the next year's tasking will become clearer. Then, during the next annual update of the strategy, the second year's tasks can be modified as needed.

This part of the Kansas Hazard Mitigation Strategy explains how the management plan is designed, the management database that underlies the management plan, the objectives that have been established for the 2001 – 2002 program year, and then details the tasks needed to achieve those objectives.

Through this management plan and its use to monitor the progress on strategy implementation, the KHMT intends to design and carry out well-defined projects, analyses and programs, as well as to strive to incorporate the results into the normal, daily functioning of state and local governments and communities throughout the state. By making the tasking for strategy implementation specific, with designated responsible agencies and well-defined work products, the KHMT believes that the strategy's goals can eventually be achieved.

In the following sections, the objectives for the first year of the implementation of the strategy are detailed, as well as the implementation strategies established to facilitate coordination of the many assignments by the KHMT's committees. Then, because this is the first year of strategy implementation, the details of the management database or explained, and how it will be used by the KHMT's support staff, the Kansas Division of Emergency Management, to monitor progress on the implementation of the strategy. Finally, a printout of the implementation tasks for the first three years of strategy implementation is provided, organized by the designated lead agency for each, is provided.

The implementation of the management plan is what makes the strategy an effective approach for the KHMT to achieve gains in the mitigation capability of the State of Kansas and all of its communities. Each year, its careful design, implementation, coordination and monitoring will be the key to success.

SECTION 1.0 *Introduction and Purpose*

This portion of the Kansas Hazard Mitigation Strategy is the annual management plan for the year beginning July 1, 2001. It describes the actions to be taken by the designated participating agencies of the KHMT to achieve various objectives established within each of the strategies five goals. This annual plan also describes, in a preliminary form; projected management plans for the second and third program year. This is to enable the KHMT to plan more complex implementation tasks that cannot be reasonably completed within the coming year. At the close of the current program year, the KHMT will formulate another annual management plan, detailing the tasks to be competed in the upcoming program year, while again projecting tasks for the second and third year.

Overall, it is expected by the KHMT that the goals established for the strategy, described in Section 5.0 of Part One, will remain relatively constant for several years. Objectives to achieve those goals and implementation tasks to achieve each objective will, however, be reviewed each year and modified as indicated.

The annual management plan is intended to provide specific, operationally oriented implementation tasks that will be more easily monitored because each has the following characteristics:

- It is entered in a database management system (Microsoft Access) to make it easier for the KDEM, as the KHMT's support staff, to routinely update and track the progress on each task. This information will be made available for each KHMT committee so that it can coordinate all of the implementation tasks,
- It is assigned to a designated lead agency that has responsibility for its completion,
- It has a specifically described work product that constitutes a measurable symbol of the tasks completion,
- It is assigned a completion schedule that is matched to other related tasks, if necessary, to enable lead agencies to plan their work efforts,
- It has an estimated budget for the lead agency to complete the work task, again to enable lead agencies to plan their work efforts, as is a potential source of funding to support completion of the task,
- If appropriate, it has a clearly definable "interim" work product assigned to the lead agency to allow for monitoring of progress on the overall task,
- It is grouped with all related assignments, regardless of the goal and objective under which they are conducted, into "implementation strategies." Each of these strategies is under the coordination and supervision of one of the KHMT's established committees,
- If applicable, follow up tasks necessary for completion of a more complex effort are provided to ensure that all of the action steps involved in a program are known and can be tracked, and
- It has other relevant management information regarding each task, such as required prerequisite tasks, to facilitate the efforts of the responsible KHMT committee to manage all of the tasks under their coordination.

In the following sections of Part 3 of the Kansas Hazard Mitigation Strategy, the objectives for the FY 2002 program year are described, along with the designated implementation strategies established to assist the KHMT committees coordinating similar assignments. Then the database management system is described to demonstrate the types of information available in the database and available for KHMT committee use.

Section 2.0 *Objectives Established for the Program Year*

The KHMT, working in a cooperative, facilitated workshop session, evaluated each of the goals established and defined one or more objectives that were considered to be feasible action steps in the first few years of strategy implementation. The purpose with these objectives is to build a strong foundation for continuing strategy implementation and expansion in future years.

The objectives defined by the KHMT for each of the five goals are provided in this table. Some additional explanation for the objectives may be helpful to understanding the implementation plan.

Goal Statement	Objective One	Objective Two	Objective Three	Objective Four	Objective Five
1] The State of Kansas will have a policy and regulatory framework that supports effective hazard mitigation programming by State and local government.	The State of Kansas will have the capability to effectively manage the human, economic, and environmental risks posed by terrorism, flooding, tornadoes, hazardous materials, drought and wildfires.	The agencies of the State of Kansas will coordinate related programs to support Federal, State and local efforts in hazard mitigation in the following areas: Flood priority areas, terrorism, drought, tornadoes and hazardous materials	The agencies of the state of Kansas will develop and promulgate hazard mitigation planning criteria.	The Kansas Hazard Mitigation Team will continue to exist under the Kansas Commission on Emergency Preparedness and Response, and will be responsible for the periodic review and updating of the Kansas Hazard Mitigation Strategy.	The Kansas Hazard Mitigation Team members will cooperate with the Kansas State Agency Response Team (SART) in efforts to enhance and support emergency response programming throughout the State
2] The State of Kansas will have effective mechanisms to gather, process, maintain, access and exchange the data and information necessary to support federal, State and local hazard mitigation and other related programs	A critical facility data and information program will be developed and implemented	Hazard mitigation database access needs and capabilities will be defined with the cooperation of KITO	Funding for increased hazard mitigation database management and access capabilities	Data and information will be publicly accessible, along with a description of hazard mitigation resources	A database of proposed and completed mitigation initiatives and projects will be developed and utilized
3] Effective training and educational opportunities in hazard mitigation and other related programs will be available for government officials, business and the public	A comprehensive state sponsored training in hazard mitigation will be developed and implemented				
4] Local governments throughout Kansas will have effective hazard mitigation policies and adequate capabilities in mitigation planning and programming	A state-wide program for community-level, all hazard mitigation planning will be developed and implemented				
5] The vulnerability of the people, property and economic vitality of the communities of Kansas will be minimized through appropriate utilization of land and natural resources	Evaluate the extent of vulnerability and risk for all hazards, and locate new funding sources for risk and vulnerability assessments in order to do so.	Promote hazard mitigation codes and provide for information exchange on sample codes	Promote regional usage of natural resources	Implement a program of inter-agency promotion of community participation in the National Flood Insurance Program	Implement a program of multi-agency cooperation on identifying priority flood areas

Goal One: ***The State of Kansas will have a policy and regulatory framework that supports effective hazard mitigation programming by State and local government.***

Objective One: *The State of Kansas will have the capability to effectively manage the human, economic, and environmental risks posed by terrorism, flooding, tornadoes, hazardous materials, drought and wildfires.*

This objective is intended to express that, through mitigation efforts, the State of Kansas will be able to manage the risks posed by all types of disasters, and that, for the initial years of the strategy, efforts would focus on the listed hazard categories.

Objective Two: *The agencies of the State of Kansas will coordinate related programs to support Federal, State and local efforts in hazard mitigation in the following areas: Flood priority areas, terrorism, drought, tornadoes and hazardous materials*

This objective acknowledges that similar types of specific mitigation programs are the responsibility of different agencies of state government, and that there is a more significant need to ensure they are effectively coordinated. For example, different flood related programs are within KDOCH, KDA, KDEM and the KWO. This places a greater emphasis on interagency coordination and cooperation than might occur otherwise. Therefore, the KHTM defined this objective and highlighted specific hazard that would be the focus of its efforts.

Objective Three: *The agencies of the state of Kansas will develop and promulgate hazard mitigation planning criteria.*

This objective also recognizes that several different state agencies have responsibilities to obtain, review and process documents that can be considered mitigation planning documents. For example, the mitigation components of the county emergency plans are reviewed by KDEM and the local flood mitigation assistance plans obtained and reviewed by the KDOCH. It was felt that without common and/or consistent criteria for these plans, confusion, ineffectiveness and duplication of effort could occur at the local level. Therefore, action was needed to unify and coordinate the state's planning criteria to make mitigation planning at the local level more effective and efficient.

Objective Four: *The Kansas Hazard Mitigation Team will continue to exist under the Kansas Commission on Emergency Preparedness and Response, and will be responsible for the periodic review and updating of the Kansas Hazard Mitigation Strategy.*

This objective is intended to ensure that the management and operation actions necessary to maintain the Kansas Hazard Mitigation Strategy would continue to occur in future years.

Objective Five: *The Kansas Hazard Mitigation Team members will cooperate with the Kansas State Agency Response Team (SART) in efforts to enhance and support emergency response programming throughout the State*

The KDEM recently initiated an effort for interagency coordination of emergency response and preparedness programs at the state level, and helped to organize the SART. It was felt that the participating agencies of the KHMT had many valuable experiences and insights into the needs of the state for improved emergency response capabilities. However, it was also recognized that these types of tasks and actions are not truly mitigation in nature and did not actually belong in the Kansas Hazard Mitigation Strategy. Therefore, the KHMT members want to share their ideas and experiences with the SART and therefore, for this first edition of the strategy, incorporated them as assigned implementation tasks within this separate objective.

Goal 2: The State of Kansas will have effective mechanisms to gather, process, maintain, access and exchange the data and information necessary to support federal, State and local hazard mitigation and other related programs

Objective One: *A critical facility data and information program will be developed and implemented*

The State of Kansas has not yet implemented any formal statewide program for the classification and identification of critical facilities, and the KHMT recognized that a very important portion of the mitigation strategy would be to protect vulnerable critical facilities from disasters' impacts. To do this, first a critical facilities program would need to be established, and information regarding their location and vulnerability gathered and organized.

Objective Two: *Hazard mitigation database access needs and capabilities will be defined with the cooperation of KITO*

The KHMT recognized that effective mitigation planning and programming would require more capabilities and knowledge regarding the information management needs for this purpose. The first step is, of course, to define more exactly what types of information would be needed and how they would be managed to achieve the desired planning capabilities.

Objective Three: *Funding for increased hazard mitigation database management and access capabilities*

This objective recognizes that, in order to gather additional information regarding the hazards threatening the state, and the state's vulnerability to those hazards, as well as establishing ways to manage the data obtained, additional funding would be needed.

Objective Four: *Data and information will be publicly accessible, along with a description of hazard mitigation resources*

This objective recognizes the importance in making key data available to all of the many agencies, organizations and individuals involved in mitigation planning and programming, particularly at the local level. It is vital, therefore, that information gathered and/or organized by the KHMT be publicly available. This database also needs to include descriptions and contact information for sources of mitigation programming assistance, which would be valuable for state and local agency personnel undertaking their own mitigation efforts.

Objective Five: *A database of proposed and completed mitigation initiatives and projects will be developed and utilized*

At all levels of mitigation planning and programming, it was recognized that information regarding mitigation initiatives implemented within the state would be valuable. Many types of information could be provided, including funding sources, hazards addressed, etc. This also includes sharing of ideas or "success stories" in local hazard mitigation to allow others to find ways to deal with the mitigation problems confronting them.

Goal Three: Effective training and educational opportunities in hazard mitigation and other related programs will be available for government officials, business and the public

Objective One: *A comprehensive state sponsored training in hazard mitigation will be developed and implemented*

A single, key objective was defined for this goal by the KHMT, in recognition that a single, comprehensive mitigation training program was needed. This would be a program that could be given by KHMT participating agencies as they fulfilled their many different training and education functions with many audiences across the state.

Goal Four: Local governments throughout Kansas will have effective hazard mitigation policies and adequate capabilities in mitigation planning and programming

Objective One: *A statewide program for community-level, all hazard mitigation planning will be developed and implemented*

This objective was established in recognition by the KHMT that the key basis of effective local mitigation programming would be comprehensive local mitigation plans. Therefore, the strategy should incorporate KHMT state agency actions to have local mitigation plans developed across the state, incorporating actions necessary to address the several individual mitigation planning requirements now in place, e.g., flood mitigation assistance program plans. In addition, the KHMT recognized that the requirements of the newly modified Stafford Act provided a strong financial incentive for local governments to prepare such plans.

Goal Five: The vulnerability of the people, property and economic vitality of the communities of Kansas will be minimized through appropriate utilization of land and natural resources

Objective One: *Evaluate the extent of vulnerability and risk for all hazards, and locate new funding sources for risk and vulnerability assessments in order to do so.*

This objective recognizes that there are major shortfalls in the knowledge regarding how and where the communities of the State of Kansas are vulnerable to the impacts of disasters. This objective is intended to begin to correct that shortfall in knowledge, beginning with locating funding sources necessary to complete the extensive and complex studies involved.

Objective Two: *Promote hazard mitigation codes and provide for information exchange on sample codes*

It was also recognized by the KHMT that very few communities in Kansas have local codes, policies and regulations that promote effective hazard mitigation and there are not many ways local officials can obtain the information necessary to develop them. This objective would involve providing suitable "model" codes and promoting their modification and adoption by local governments.

Objective Three: *Promote regional usage of natural resources*

This objective is in recognition that, for Kansas, regional usage of resources could be an excellent mitigation tool, particularly for smaller communities. For example, greater regional utilization of water resources could help to mitigate the health, economic and environmental impacts of drought.

Objective Four: *Implement a program of inter-agency promotion of community participation in the National Flood Insurance Program*

The KHMT established this objective in view of the lower levels of participation in the NFIP program, in spite of Kansas' relatively high vulnerability to flooding. Working through the Kansas Hazard Mitigation Strategy could also provide opportunities for interagency promotion of the program in view of the number of state agencies involved in management of the flood risk.

Objective Five: *Implement a program of multi-agency cooperation on identifying priority flood areas*

This objective recognizes, again, that several Kansas agencies are responsible for programs related to flood risk management, and that their interagency cooperation would be highly beneficial in reducing local vulnerability to this hazard. This objective, in particular, is to have multi-agency involvement in identification of the priority areas for state agency attention on flood management projects.

Section 3.0 Implementation Strategies

The KHMT recognized that there were common elements to many of the programs and activities that could be expressed within each of the objectives discussed in the preceding section. For example, flood mitigation program improvements involve local mitigation planning, codes and regulations, training, etc. These commonalties offer opportunities for improved coordination among the programs and tasks under the oversight of specific committees of the KHMT. Therefore, eight common strategies were developed and assigned to the coordination and oversight responsibilities of the committees. These common implementation strategies are the following:

- Code and regulation development and enforcement
- Organizational development and strategy maintenance
- State training programs
- Hazard specific mitigation program development (e.g., flood mitigation program development, wildfire mitigation program development, etc.)
- Data development
- Community hazard mitigation planning
- Grants management coordination
- Enhancing emergency response capabilities.

Review of the database for management of the tasks indicated which category each implementation assignment has been placed, and hence the other assignments within the strategy to which it is related.

Section 4.0 *The Strategy Implementation Tasks*

The appendices to Part 3 of the Kansas Hazard Mitigation Strategy explain the implementation tasks formulated for the KHMT participating agencies, and how they can be managed and monitored.

Appendix One provides a sample record for a single implementation task that is contained with in the database. Inspection of this form indicates the type of information available for each task, as incorporated into the database. The database is in Microsoft Access and any type of report necessary to support the activities of KHMT committee or participating agencies can be prepared. Highlights of the database management system and implementation task information include:

- Assigning a number identification number of #.#.#, which is means “Goal #.Objective #.Task #.” Therefore each implementation task, by number, can be instantly associated with the correct goal and objective.
- A complete task description,
- A checkbox for “all agencies” for those tasks to be completed by every participating KHMT agency or organization.

- Identification of the lead, support and cooperating agency for the task, as well as the KHMT coordinating committee,
- A field to indicate phased tasks, and in which phase a particular task is scheduled for completion,
- Identification if there are any “prerequisite” tasks that must be completed before this task, or if there are any “related” tasks to this one.
- A budget estimate for task completion and a logical funding source for the task,
- A description of the final and interim work products, with completion dates specified. The final and interim work products are intended to be in consistent “measurable” terms, e.g., a report written, X number of classes taught, etc.
- A place for listing any associated, established program for which the lead agency is also responsible,
- The implementation strategy within which this task has been classified, and
- If the work product is an item that must be submitted to another agency because of statute, regulation or policy, and if so, the name of that agency.

KDEM, as the support staff for the KHMT, will be able to use this database to help participating agencies identify their assignments, to track progress, and to prepare suitable reports.

Appendix Two provides an example of one type of report that can be prepared from the database. In this case, key information regarding all of the implementation tasks is provided in a table organized by the designated lead agency.

Review of the information given in this appendix will provide a detailed understanding of the implementation tasks scheduled for the ensuing three-year period. The database will be used by the KHMT to initiate implementation of the Kansas Hazard Mitigation Strategy on or about July 1, 2001.

Kansas Hazard Mitigation Strategy

Part 3

The Annual Implementation Plan

Appendix One

Illustration of the contents of the KHMT implementation task database

Kansas Hazard Mitigation Strategy

Part 3

The Annual Implementation Plan

Appendix Two

Implementation Tasks Identified by Lead Agency